

PERSPECTIVE PLAN OF GUJARAT

1974-1984

Volume II

BARODA

PRINTED AT THE GOVERNMENT PRESS

1972

Foreword

Soon after the introduction of President's Rule in Gujarat, the State Planning Advisory Board was reconstituted with the Governor as the Chairman, the Adviser to the Governor as the Vice-Chairman and with industrialists and experts in various fields of development as Members. In the first meeting of the reconstituted Board held on the 5th July 1971, it was decided to prepare a Perspective Plan for the economic development of the State for the decade 1974-84 with the basic objectives of full employment, more production, equitable distribution, diffusion of economic power and balanced development. The following Working Groups were constituted for the purpose :—

(1) *Agriculture, Irrigation, Animal Husbandry and Forests :*

Shri H. M. Patel, M. P. ... ... *Chairman*
Dr. V. Kurien ... ... Member
Chairman, Agro-Industries Corporation ... ... "
Shri Manilal Desai ... ... "
Shri K. Sivraj, ... "
Secretary, Public Works Department
Shri L. M. Shrikant, ... "
Former Commissioner for Scheduled Castes and
Scheduled Tribes, Government of India
Shri K. G. Badlani, ... Member-Secretary
Secretary,
Agriculture, Forests and Co-operation Department.

(2) *Industry, Power and Minerals :*

Shri Madanmohan Mangaldas ... ... *Chairman*
Shri Arvindbhai N. Mafatlal ... ... Member
Shri Jaikrishna Harivallabhdas ... ... "
Shri Utsavbhai Parikh ... ... "
Dr. Bal Kalelkar ... ... "
Shri J. J. Mehta, ... "
Chairman, Indian Petrochemicals Corporation Ltd.,
Baroda
Shri Jayantilal Bhikhabhai, ... "
Chairman, Gujarat Industrial Development Corporation
Shri Sanat Mehta, Baroda ... ... "
Shri K. A Dave, ... "
Chairman, Gujarat Electricity Board
Shri M D. Rajpal, ... Member-Secretary
Additional Chief Secretary,
Industries, Mines and Power Department.

(3) *Transport and Communications :*

Shri K. T. Satarawala, ... *Chairman*
Adviser to the Governor
Shri Rohitbhai C. Mehta, ... Member
Chairman, Gujarat Export Corporation,
Ahmedabad

Shri Balkrishna Harivallabhdas, ...	Member
President of Gujarat Chamber of Commerce and Industry, Ahmedabad	"
Dr. Samuel Paul, ...	"
Indian Institute of Management, Ahmedabad	
Shri K. M. Kantawala, ...	"
Chairman, Gujarat Housing Board, Ahmedabad	
Shri M. D. Patel, ...	Member-Secretary
Chief Engineer, Roads and Buildings, Public Works Department.	

(4) *Education and Manpower Plannig :*

Shri Umashankar Joshi, ...	*Chairman*
Vice-Chancellor of Gujarat University	
Shri N. K. Vakil, ...	Member
Vice-Chancellor, M. S. University of Baroda	
Shri Ishwarbhai Patel	"
Shri P. G. Mavlankar	"
Shri V. R. Mehta, ...	Member-Secretary
Secretary, Education and Labour Department.	

(5) *Rural-Urban Development :*

Shri Chinubhai Chimanbhai	*Chairman*
Shri C. S. Chandrasekhara, ...	Member
Chief Planner, Town and Country Planning Organisation, New Delhi	
Shri A. V. D'Costa, ...	"
Leader, Metropolitan Transport Team, Planning Commission	
Shri B. V. Doshi, ...	"
Director, School of Architecture, Ahmedabad	
Additional Chief Secretary to Government, ...	"
Industries, Mines and Power Department	
Secretary to Government, ...	"
Education and Labour Department	
Secretary to Government, ...	"
Panchayats and Health Department	
Secretary to Government, ...	"
Agriculture, Forests and Co-operation Department	
Secretary to Government, ...	"
Public Works Department	
Shri H. K. Mewada, ...	Member-Secretary
Chief Town Planner and Architectural Adviser, Public Works Department.	

(6) *Pollution of Air and Water :*

Shri R. S. Mehta, ...	*Chairman*
Vice-Chancellor, Sardar Patel University	
Dr. M. N. Gupta, ...	Member
Director, National Institute of Occupational Health, Ahmedabad	

Shri Digvijay Sinh, Chairman, Ecological Council, Gujarat	...	...	...	... Member
Shri K. M. Satwani, Secretary, Legal Department	...	...	...	... "
Shri R. B. Shukla, Development Commissioner.		...	...	... Member-Secretary

A Steering Group with the Governor as the Chairman, the Adviser to the Governor as Vice-Chairman and with Chairmen of different Working Groups and Director of Sardar Patel Institute of Economic and Social Research, Ahmedabad as members was constituted to co-ordinate the work of the various Working Groups and to prepare an integrated Perspective Plan of Gujarat for the decade 1974-84.

The Perspective Plan as finalised by the Steering Group is printed as Volume I, while Volumes II and III contain the reports of the Working Groups and the programmes as worked out by Departments for the Perspective Plan period in respect of sectors not covered by the Working Groups. Charts and maps in respect of some of the vital sectors of the economy as prepared by the Working Groups are also included in Volumes II and III.

I am grateful to the Chairmen of the various Working Groups for their hard work in preparing valuable and exhaustive reports in record time. I take this opportunity to thank Dr. Yoginder Alagh and his associates of the Sardar Patel Institute of Economic and Social Research for their paper on the Internal Consistencies of the Perspective Plan document 1974-84. I am also grateful to Shri D. V. N. Sarma, Director of the Operation Research Group, Baroda and Mr. Malcom Mackenzie and Mr. Louigi Ginazzini for their papers on the Rate of Growth in Gujarat 1974-84—Targets and Their Feasibility as well as on the Present Planning Methodology and Future Development. Thanks are also due to the Members of the Working Groups and other officials who had to labour hard to prepare these documents in a short time.

It is hoped that the details of programmes in Volumes II and III will be of particular interest to all those who are interested in the development of the economy of the State in particular and our country in general.

Sachivalaya, Gandhinagar,
February 10, 1972.

K. T. SATARAWALA
Vice-Chairman of the Steering Group

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OF
GUJARAT
1974-1984

REPORT
OF THE
WORKING GROUP

ON

AGRICULTURE, IRRIGATION, ANIMAL HUSBANDRY AND FORESTS

Foreword

Planning and development are continuous processes in which the priorities and objectives for each period are linked with a larger perspective. The real significance of a long term perspective lies in this, that decisions on more immediate and current issues can be taken more satisfactorily and soundly. It assists in a clearer understanding of possible obstacles that may have to be overcome if the economy is to grow and develop at the desired rate; it helps, of course, in taking timely decisions. Again, a long term Plan could supply a general pattern of social and economic development which takes into consideration the needs and possibilities for different areas and harmonizes them into an integrated endeavour for advancement.

2. As this Working Group has been entrusted with the task of preparing a Perspective Plan for the agricultural and allied sectors for a period of ten years, that is, covering the Fifth Plan (1974-79) and the Sixth Plan (1979-84) periods, this report outlines the long term strategy and programmes for these sectors. The strategy visualised emphasises the maximising of productivity in agriculture.

3. This would be possible only if irrigation potentialities are fully exploited. Unfortunately, so far as the most important source of irrigation available to the State is concerned, namely Narmada, no progress can be achieved until the Tribunal has given its award and it becomes possible to proceed further on the basis of that award. All that can be done in regard to Narmada is to envisage financial provision on the assumption that implementation will become feasible towards the end of the Fourth Plan. Partly because our total water resources are limited, but even more because wasteful use of water does positive harm to land, it should be our endeavour particularly to see that the available water is put to fullest use. Particular emphasis has, therefore, to be laid on water conservation, proper use and management of water, soil and moisture conservation, and adoption of scientific dry farming methods over large areas.

4. Agricultural productivity is closely connected with a variety of other factors which too will require close attention to adoption of scientific agricultural practices, education and research, and sophistication of extension services; training of farmers in scientific irrigated and dry farming; better use of available land resources through land use planning, extension of multiple cropping patterns and plant protection; fortification of the rural economy, as far as feasible, along co-operative lines, including the provision of services, credit, marketing, processing and distribution; minimising wastage in storage, and ensuring efficient service and fair return to rural producers as well as supply at reasonable rates to consumers; and diversification of rural occupational structure.

5. Emphasis will also have to be laid on expansion of dairying activity, preferably along co-operative lines, not merely as a subsidiary industry for the substantial landholder, but as the major economic activity of the landless and the marginal holder. A corollary of this would be the adoption of a well conceived and imaginative cattle development policy, designed to improve the quality of existing cattle, besides developing cross-bred types capable of increasing milk production. This will in its turn involve planned development of fodder production.

6. A sound strategy for the future would call for a most stringent forest protection policy in view of the extremely low forest cover in Gujarat, stated to be about 8.8 per cent of the total area of the State as against the ecological necessity of one-third area being under forests. As large tracts out of this meagre forest area consist of grass lands, reafforestation, particularly in catchment areas of the rivers flowing in Gujarat, assumes very critical importance, and active assistance of the Centre and the neighbouring States will have to be sought and secured for this purpose.

7. Lastly, but most importantly, the potentialities of the long coastline of the State should be fully exploited for the development of fisheries. A very high priority must be given to this project, and this will involve expeditious development of the infra-structure, particularly of the development of harbours.

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Preface

At the first meeting of the reconstituted State Planning Advisory Board held at Raj Bhavan on 5th July 1971, it was decided that the Board should prepare and publish the outline of a Perspective Plan for a ten year period (1974-1984) by the middle of November, 1971. In pursuance of this decision of the State Planning Advisory Board, the State Government, by General Administration Department Resolution No. TYP-1071-D, dated 17th July 1971, appointed several Working Groups for preparing the outlines for the Ten Year Perspective Plan (1974-1984) for the sectors allotted to them. A Steering Group was also appointed to co-ordinate the reports of the Working Groups and prepare an outline of a consolidated Perspective Plan for the State. The Working Groups were requested to submit their reports by the middle of October, 1971, a time limit which was extended later by a month. Full employment, more production, equitable distribution, diffusion of economic power and balanced development were given as the basic objectives of the Ten Year Perspective Plan for the guidance of the Working Groups.

2. The Working Group for Agriculture, Irrigation, Animal Husbandry and Forests consists of the following Members :—

Shri H. M. Patel	Chairman
Dr. V. Kurien	Member
Chairman, Agro-Industries Corporation	„
Shri Manilal Desai, Oorlikanchan, District Poona.	„
Shri K. Sivraj, Secretary, Public Works Department.	„
Shri L. M. Srikant, Ex-Commissioner for Scheduled Castes and Scheduled Tribes, Government of India.	„
Shri K. G. Badlani, Secretary, Agriculture, Forests and Co-operation Department..	Member-Secretary

3. It was decided also to invite the co-operation of following persons, experts in their fields, to assist the Group in its consideration of the various important problems relating to its assignment :

Shri Nanubhai B. Amin

Dr. J. S. Patel

Shri Praful Bhatt.

4. At its first meeting held on 2nd August 1971, at Ahmedabad, the Working Group appointed three Sub-Groups— (i) Agriculture, Animal Husbandry, Dairy Development, Forests, Co-operation and Agro-Services, (ii) Irrigation, including major, medium, and minor irrigation, and (iii) Fisheries.

5. The Working Group as a whole held five meetings to consider the reports of the Sub-Groups.

8. The Working Group has further emphasised the importance of an adequate administrative and executive machinery for implementing the various pogrammes and schemes recommended by it. It has, therefore, made concrete suggestions in this direction. Thus, for many matters, it has suggested the constitution of autonomous Boards; in the case of dairy and animal husbandry, it has gone to the length of suggesting the complete overhaul of the entire development; in regard to Co-operative Department, it has suggested the setting up of separate departments for marketing and for industrial co-operatives. It has also laid emphasis on seeing to it that the administration has adequate information, statistical and other, which would enable it to implement the recommendations that have been made in this report and to formulate the modifications of policies and programmes as developments take place.

9. For the sake of convenience, as also to obtain a broad idea of the objectives proposed to be achieved in the various sectors covered by the Group, the important recommendations made are summarised hereunder :—

I. Agriculture

(1) Achievement, at the end of ten years, of annual production of (*a*) 80 lakh tonnes of foodgrains, (b) 25 lakh tonnes of oil seeds, (c) 10 lakh tonnes (in the form of gur) of sugarcane and (d) 30 lakh bales of cotton.

(2) Intensive research effort on pulses and groundnut.

(3) Development of dry farming practices and establishment of a full-fledged arid zone research station.

(4) Special programmes for small and marginal farmers to enable them to put their small and marginal holdings to optimum use and become economically viable.

(5) Encouraging storage in silos of different sizes at different levels.

(6) Establishment of a State Seeds Corporation on the lines of the National Seeds Corporation.

(7) Establishment of a Farm Machinery Testing Centre.

(8) Setting up farm service centres and financial assistance to such centres in areas which are backward agriculturally.

(9) A regional food technological laboratory.

(10) Setting up an autonomous Board for Perishables.

(11) Review of organisational set-up and improvement of the statistical set-up.

(12) Free trade in groundnut supplemented by creation of a buffer stock; *in the alternative*, establishment of an autonomous Groundnut Board.

(13) Establishment of a Directorate of Agricultural Marketing.

(14) Marketing and processing to be attempted in the co-operative field, wherever feasible.

(15) Water conservation and efficient use and management of water.

(16) Aerial spray of insecticides, pesticides, fungicides, etc., on area basis.

(17) Provision of more qualified and specialised extension services.

(18) Setting up a State Organisation for procurement of foodgrains to supplement the efforts of the Food Corporation of India.

(19) Setting up four agricultural research stations.

II. Soil Conservation

(1) High priority to reclamation of ravine lands and establishment of a Ravine Reclamation Board; the Board should not only take steps to stop erosion of the ravines but also put the reclaimed lands to the best use possible and manage them so as to bring them to a safe stage of development before transferring them to their owners or other parties. The Board should be invested with adequate powers to perform all these functions.

(2) The khar land reclaimed by the Khar Land Board should be developed by the Board by making necessary investment and the developed land should be managed as Government farms by the Board. For this purpose, the Board should be reconstituted. The disposal of the reclaimed lands to private individuals should, in any case, not be made until they have been under the Board's management for at least six agricultural seasons.

III. Irrigation

(1) All major and medium irrigation schemes except (*a*) Narmada Project, (*b*) the schemes located in higher rainfall areas, and (*c*) a few schemes which are difficult ones, should be completed during the Fifth and Sixth Plans.

(2) All minor irrigation schemes, as far as possible, should be completed by the end of the Fifth Plan.

(3) Assessment and exploitation of ground water resources should be almost completed by by the end of the Fifth Plan.

(4) Pilot projects for recharging of wells should be taken up in selected areas.

(5) A large programme of community wells should be taken up in selected backward areas.

(6) Flood control schemes should be completed with utmost speed. A Flood Control Board should be created.

(7) The Government of India should be approached for treatment of catchment areas of various river valley projects.

(8) High priority should be given to soil survey and drainage in the command areas of irrigation projects.

(9) High priority for integrated area development of the command of irrigation projects.

(10) Priority for training and research.

IV. Animal Husbandry and Dairying

(1) To establish a Directorate of Livestock Production and Marketing and the merging of the existing Directorate of Animal Husbandry and Dairying therein.

(2) To channel production, procurement, processing and marketing of milk and milk products through producers' co-operative unions and to use co-operative unions as the vehicle for all investments and technical inputs for milk production enhancement programmes.

(3) Milk pricing on a two axis formula : the fat and non-fat solids being valued in the ratio of 3:2.

(4) Establishment of a Federation of Producers' Co-operative Unions.

(5) Improvement in pay scales with a view to attracting better talents to Dairy and Veterinary Services.

(6) Organisation of an Autonomous Breeders' Association.

V. Forests

(1) A strong forest protection policy.

(2) Regulation of grazing in the forest according to its carrying capacity.

(3) Ban on disforestation for any purpose except in accordance with the working plans.

(4) Re-afforestation of deforested lands in the catchment areas of river valley projects.

(5) Consolidation of forest areas.

(6) Encouragement to Panchayats and individual farmers to grow quick growing trees suitable for fuel.

(7) Strengthening the Ecological Council by investing it with adequate powers and providing it with the funds it needs.

(8) Development of Gir Sanctuary into a National Park and the shifting of Maldharis residing in the sanctuary area to some other areas.

(9) Undertaking massive plantation and maintenance of trees along roadsides and canalsides.

(10) Extensive afforestation on coastal areas.

VI. Fisheries

(1) Very high priority should be given to the development of fisheries in view of (a) value of fish as good nourishing food, (b) possibility of rapid return on investment, and (c) almost limitless scope for development.

(2) Establishment of an autonomous Board for Fisheries in place of the existing Department of Fisheries.

(3) Early survey of deep-sea fishing areas.

(4) Speedy development of necessary infra-structure, particularly the development of fishing harbours.

(5) Modernisation of fishing methods, preservation techniques and marketing practices.

(6) Establishment of training institute to meet the personnel demand.

(7) Intensification of inland pisciculture.

VII. Co-operation

(1) Linking agricultural credit with marketing and processing in the co-operative sector.

(2) Covering 95 per cent land holders in the co-operative fold by the end of the Sixth Plan.

(3) Re-organisation of the Co-operative Department on functional basis and establishment of separate Directorates of Marketing and Industrial Co-operatives.

10. In respect of some of the recommendations, action for implementation will be necessary well before the commencement of the Fifth Plan so that implementation of other recommendations can be started in time. For instance, the most important requirement for the implementation of irrigation schemes and animal husbandry and fisheries programmes is provision of training facilities so that qualified personnel become available when actual implementation is taken up.

11 The long term Plan indicated above proceeds on the assumption that there would be available :

(1) an adequate quantity of fertilisers, pesticides, insecticides, agricultural implements of improved quality, and storage bins,

(2) an adequate quantity of reliable power supply, particularly for energizing wells and tubewells,

(3) approach roads to market centres, or to roads leading to market centres, and

(4) industrial units for processing agricultural products for the Agro-Industries Corporation alone will not be able to meet the total requirements of the farmers, and it is important that agricultural products should be processed expeditiously and in time.

It is hoped that these may, no doubt, have been provided for in the Plans that will have been prepared by the Working Groups.

12. This Working Group has necessarily limited itself to the long term strategy and programmes for certain sectors only of the economy. It is expected that these will be integrated with similar programmes of other sectors of the economy with a view to formulating a comprehensive long term Plan for the entire area of the State. While a long term view of development is a useful guide in framing policies and programmes and assessing progress, it has itself to be reassessed from time to time in the light of actual achievement and experience, so that appropriate modifications can be carried out in time wherever such modifications are found to be necessary. Further, the Perspective Plan for the State as a whole will have been formulated on certain assumptions regarding the availability of resources particularly financial. If these assumptions are not borne out and if the financial resources position should at any stage call for a curtailment of the Plan, such a curtailment should be carried out with extreme care, so that the priorities as between different programmes of different sectors of the economy are not unduly disturbed. This task would be best done if it is assigned to those who drew up the Plan and the programmes.

Report of the Working Group on Agriculture, Irrigation, Animal Husbandry and Forests

Part - I

Agriculture, Animal Husbandry and Dairying, Forests, Fisheries and Co-operation

CHAPTER I

INTRODUCTION

1.1 The Gujarat State, formed on 1st May, 1960 as a result of bifurcation of the former Bombay State, is situated on the west coast of India between 20 1 and 24.7 degree north latitude and 68.4 and 74 4 degree east longitude and bounded by the Arabian Sea in the west, Pakistan in the north, Rajasthan in the north-east, Madhya Pradesh in the east and south-east and Maharashtra in the south

Administrative Divisions

1.2 The State is divided into 19 districts which are further divided into 184 talukas/mahals.

Area and Population

1.3 The State has an area of 1,87,091 sq. kms which is 5.7 per cent of the area of the Indian Union. Its population according to the provisional figures of 1971 census is 2.67 crores as against 2 06 crores, according to 1961 census. This marks an increase of population in the last decade at the rate of 29.34 per cent as against the all India average of 24 57 per cent. The percentage of the urban population to the total population is 28.13 (as against 25.77 in 1961), the decennial growth of urban population being 43.33 per cent. The total urban population is 75 07 lakhs living in 217 towns. The total number of workers is 84.29 lakhs out of which 36.25 lakhs are engaged in cultivation and 18 59 lakhs as agricultural labourers and the remaining 29.45 lakhs are engaged in work other than cultivation and agricultural labour. Agriculture provides employment to 65.07 per cent of the population as against 68.09 per cent in 1961.

Physio-Geographical Conditions

1.4 Gujarat has two distinct physio-geographic regions : Gujarat Main land and Peninsular Gujarat. The first can be sub-divided into North, Central and South Gujarat plains and the second into Saurashtra and Kutch. The main land, forming the alluvial valleys of the Sabarmati, Mahi, Narmada and Tapti rivers fed by catchments, extending over large areas of Rajasthan and Madhya Pradesh and flowing from east to west and converging towards the Gulf of Cambay, is rather narrow towards the south and gradually widens towards the north. The topography of the coastal regions is marked by salt marshes, sandy belts and gravel patches while the even nature and fertility of the plain is affected by erosion. The Saurashtra region, joined to the main land by a neck of low-lying land, has low hills, alternating with tiny alluvial basins. The two masses of hills in the central and southern tracts of this region give rise to an almost perfect radial drainage pattern. The Rann of Kutch lying at the northern end is a vast expanse of tidal mud flats, flacked with saline efflorescences.

1.5 The average rainfall in the areas of the State varies from 33 to 152 cms or 13 to 60 inches. In southern and eastern districts (Dangs, Bulsar, Surat, Broach, Baroda, Panchmahals and Sabarkantha), the annual rainfall varies between 76 and 152 cms. or 30 and 60 inches except in some parts of Dangs where the rainfall is around 190 cms. or 75 inches In the northern districts (Kaira, Ahmedabad, Gandhinagar, Mehsana and Banaskantha), the rainfall varies between 51 and 102 cms. or 20 and 40 inches. In the Saurashtra region, the south central high lands and the Cambay Gulf regions generally have rainfall of 63 cms. or 25 inches and over, whereas the other parts, comprising areas of Jamnagar and Junagadh coastal regions, receive generally less than 63 cms. or 25 inches of rainfall. The rainfall is very low in Kutch which is known for its semi-desert conditions. On account of the erratic nature of the incidence and distribution of rainfall, certain areas in North and Peninsular Gujarat are prone to chronic scarcity condition while certain areas in South Gujarat are occasionally affected by floods.

Land Utilization

1.8 0 Gujarat is one of the eleven States in the Indian Union where the cultivated area is more than 50 per cent of the geographical area. The table below shows the land utilization pattern in Gujarat.

TABLE

Yearwise Land Utilization Statistics in Gujarat State

(Area in '00 hectares)

Year 1	Reporting area for land utilization purpose 2	Forest 3	Barren and unculturable land 4	Land put to non agricultural uses 5	Culturable waste 6	Permanent pasture and other grazing land 7
1950-51	1,69,011	11,385	45,582	1,852	6,531	5,277
1955-56	*1,79,466*	*8,432*	*50,414*	*3,423*	*9,199*	*8,627*
1960-61	1,82,986	11,428	47,385	4,059	7,640	10,421
1965-66	1,85,325	16,348	43,772	5,225	5,415	10,096
1966-67	1,85,325	16,263	43,652	5,301	5,250	10,090
1967-68	1,85,325	16,268	43,409	5,373	5,080	10,106

Year 1	Land under miscellaneous tree crop 8	Current fallows 9	Other fallow land 10	Net area sown 11	Area sown more than once 12	Gross cropped area 13
1950-51	4,410	5,276	13,157	81,876	2,847	84,723
1955 56	540	2,916	4,850	91,065	3,950	95,015
1960-61	416	3,413	4,254	93,970	3,706	97,676
1965-66	226	4,420	2,940	96,883	4,998	1,01,881
1966-67	236	4,103	3,010	97,420	4,575	1,01,995
1967-68	223	3,849	3,000	98,017	6,187	1,04,204

The net sown area in 1967-68 works out to about 52.9 per cent of the total reporting area The cultivated area is more than 50 per cent in all the districts except Kutch and Dangs where it is less than 25 per cent. The cultivated area is low in Dangs on account of extensive forests and in Kutch on account of the Rann of Kutch. The cultivated area is more than 75 per cent in the districts of Amreli, Mehsana and Kaira.

1.8.1 There is hardly any scope for bringing more land under cultivation except through reclamation of ravine lands, the Banni and the Rann of Kutch and through increase in gross cropped area by increasing irrigation facilities leading to double/triple cropping.

1.8.2 A fallow land study concluded in the districts of Surendranagar and Mehsana has indicated that most of such land is kept fallow mainly due to less retentive nature of soil, thin layer of soil, saltish nature of land and uneven condition of land.

1.8.3 The soils in the districts of Kutch, Banaskantha, Mehsana and Sabarkantha are susceptible to wind erosion, particularly during the spring and summer, as there is no sufficient vegetation cover for adequate soil protection. The southern districts face the problem of soil erosion due to surface run off whenever there is excessive rain.

1.8.4 The land utilization figures indicate the limited scope for extensive cultivation and the necessity for concentrating attention on intensive agriculture for increasing agricultural production by improving agricultural productivity of the soil.

Crops

1.9.0 Paddy, wheat and bajri are the main food crops in Gujarat. Jowar and maize are the other important food crops in localized areas but the former is grown extensively all over the State for fodder purpose. Cotton and groundnut are the important commercial crops in the State. Another important crop is tobacco. There are other crops like isabgul, cumin, fennel, mangoes and bananas which, though grown in restricted pockets, are very important to the areas concerned. The economy of the State shows a propensity towards agro-based industries.

1.9.1 The selection of crop mainly depends on the suitability of soil and climate, availability of irrigation facilities and trend of prices. The areas under different main crops during different periods are shown in the table below :—

TABLE

(Area in lakh hectares)

Crop	Average area during 1951-56	Average area during 1956-61	Average area during 1961-66	Average area during 1966-69	1969-70	1970-71
Rice	4.703	5.263	5.461	5.010	4.869	4.886
Wheat	3.820	4.616	4.344	4.944	4.326	5.772
Bajri	20.919	15.556	14.809	17.610	16.582	17.821
Jowar	15.575	13.901	13·579	13.424	13.149	13.336
Maize	2.005	1.984	2.342	2.681	2.688	2.746
Groundnut.. ..	8.539	16.379	21.331	18.990	17.476	17,583
Cotton	13.719	17.501	17.561	16.580	16.471	15.818
Tobacco	0.604	0.865	0.839	0.864	0.887	0.869

Water

1.10.0 The domestic needs of water in rural areas are comparatively small and can be met from underground resource and small surface tanks. The needs of cities and industries do need consideration but they too are small as compared to the needs of agriculture which are large.

1.10.1 The total surface water resource of the State, excluding the Narmada basin, is estimated at 46.05 m. cu. m.* of which the utilizable water resource is only 15.36 m. cu. m. which can create an ultimate irrigation potential of 26.4 lakh hectares (which is 21.4 per cent of the total cultivable area). The low extent of the utilizable surface water resource is mainly due to lack of reservoir sites on account of the flat nature of the terrain and non-availability of suitable foundations. The surface water resource harnessed by March, 1969 was 4.45 m. cu. m. and that expected to be harnessed by the end of the Fourth Plan, *i. e.*, 1973-74 is 8.91 m. cu. m. which is 57.8 per cent of the total utilizable resource.

1.10.2 The underground water resource has not yet been scientifically assessed. A Ground Water Directorate has been set up in February, 1970 for assessment of ground water resource and its scientific use. Investigations in 16822 sq. kms. were carried out by 31st March 1971 and are expected to be completed in 26482 sq. kms. by the end of the Fourth Plan. The position of ground water resource utilization at the end of 1967-68 is shown in the table below.

TABLE

Sr. No.	Nature of wells	Irrigation potential (in lakh hectares)	Utilization (in lakh hectares)
1	Tubewells	1.32	0.34
2	Dug wells	.	8.86

* *Milliard cubic metres*

Livestock

1.11.0 The livestock not only forms the main source for the supply of draught power for cultivation and rural transport, but it also supplies food like milk, meat, eggs and other products like wool, hides, skins and organic manure.

1.11.1 The livestock population of Gujarat is shown in the table below :—

TABLE

Livestock Population

Item	Unit	Year			
		1951	1956	1961	1966
1	2	3	4	5	6
Cattle-Females over 3 years ..	In '000	1,635	1,668	1,838	1,750
Buffaloes-Females over 3 years ..	"	1,661	1,488	1,702	1,820
Sheep and Goats	"	3,933	4,370	3,705	4,423
Total Livestock	"	13,065	13,414	13,454	14,33[illegible]
Total Poultry	"	1,142	1,951	2,048	2,324

According to the 1966 livestock census, there are 62.57 lakh cattle and 31 40 lakh buffaloes. Female cows over 3 years of age are 17.80 lakhs and female buffaloes over 3 years of age are 18.20 lakhs. According to the field survey conducted by I. A. R. S. (1963-64) the percentage of animals in milk to total milch animals is 46 amongst cows and 61 amongst buffaloes The average daily milk yield per animal in milk was 1.67 kgs. for cows and 3 08 kgs. for buffaloes. This survey also covered poultry and reported an annual average yield of 86 eggs per hen There are 16.52 lakh sheep, the average yield of wool per sheep being 1.08 kgs. The State has several distinct breeds of cows and buffaloes. Some cow breeds are excellent as draught and are also known for milk potential.

Forests

1.12 According to the land utilization statistics for 1967-68 (*vide* table in para 1.8 0), the forests account for about 8.8 per cent of the State's total area. This is very low as compared to the national average of 23 per cent whereas experts are of the view that one-third of the area should be under forests for maintaining a proper balance in nature. Substantial areas included in the aforesaid figures of forest area either consist of grass lands or have been denuded of tree growth during the course of years. The forest growth ranges from xerophilous shrubs, approximating to desert conditions in the north and north-west to deciduous rich forests in the south. There is considerable imbalance in the regional and local distribution of forests. It is reported that 44 per cent of the forest area lies in the dry zone and 18 per cent in the arid zone, leaving only 38 per cent in the favourable rainfall zone. The main items of production are timber, firewood, bamboos, grass, gum, resins etc. Due to inadequate production and inequitable distribution of forests, the needs of the people are not adequately met and there remains a large gap between production and demand. The growing volume of trees in the forest area is estimated at 345 lakh cubic metres and the annual increment after making allowance for damage by forest offences, insects, etc., is only 4.9 lakh cubic metres which is too low to meet the needs of the population and the industries of the State.

Fisheries

1.13.0 India, the largest country in the Indian Ocean region, exploits only a small portion of the potentialities of the sea around. The annual production in 1968 was only 0.91 million

tonnes in the country and only 9.59 per cent thereof was Gujarat's share. The potentialities of the country's marine resources indicate that it is possible to increase annual fish production to 12 million tonnes by extensive exploitation of fisheries from off shore and deep sea regions.

1.13.1 Among the maritime States in the country, Gujarat has the longest coastline of 1663 kms., nearly one third of the total coastline of India. The total marine fishable area is about 1.20 lakh sq. kms. including the Gulf of Kutch and the Gulf of Cambay. Species like Bombay duck, pomfrets, Indian salmon, hilsa, prawn, perch and tuna are found in large quantities in these waters. Some of the richest fishing grounds in India are located off Gujarat coast. The Gulf of Kutch also provides favourable conditions for growth and sustenance of pearl oysters, edible oysters, window pane oysters, chanks, other small fish, turtles, seaweeds etc. Besides, rivers, canals, reservoirs, tanks, estuaries and brackish water areas form rich potential sources for inland fisheries.

CHAPTER II

TWENTY YEARS OF PLANNING

2.1.0 The basic objectives of the long term national plan are to achieve self-sustaining economic growth, to provide avenues and opportunities of employment to all those who seek it, and to ensure a minimum level of living to every family in the country. The essence of the process of transformation of a static and stagnant economy into a self-reliant and self-generating economy lies in pushing up the levels of investment which would ensure rapid increase in the national product and per capita income. The increase in income level enables the economy to secure higher levels of investment without lowering per capita consumption. With progressive increase in investment the economy secures rapid growth and reaches a stage where further growth at an adequate rate is possible without the help of foreign aid, and the economy becomes self-reliant In order to draw up the correct strategy and chalk out clear-cut programmes, it is necessary to review the past achievements and failures which would provide a basis for determining the direction of further advance.

2.1.1 When India became independent it had a slender industrial base and its rural population suffered under the weight of a traditional agrarian structure. A long period of economic stagnation followed by the Second World War and the partition of the country had weakened and dislocated the Indian economy. It was essential to rebuild the rural economy and to lay the foundation for industrial and scientific progress. This called for planning on a national scale. The past twenty years of planning have witnessed rapid expansion of the Indian economy. There has been rapid increase in industrial production while agricultural production has recorded substantial gains. A marked rise in prices, especially since the Third Five Year Plan, has, however, been a cause of serious concern. The main aim of the future plans should be to achieve growth with stability.

2.1.2 During the First Five Year Plan period, Gujarat did not exist as a separate State During that period, Saurashtra and Kutch existed as separate entities while the rest of the areas comprised in the present Gujarat State formed part of the former Bombay State With the formation of the bigger bilingual Bombay State on 1st November, 1956, all the areas presently comprised in Gujarat State became parts of one State. The bilingual Bombay State was bifurcated during the course of the Second Five Year Plan and Gujarat State was formed on 1st May, 1960. Despite the stresses and strains of bifurcation and the initial difficulties which confronted the infant State, the Second Plan was completed with considerable success As against the Second Plan projected outlay of Rs. 145.87 crores for the new State, the actual expenditure was Rs. 152 51 crores which showed an increase of 4 per cent over the original outlay. The Third Five Year Plan was the first concerted effort at the development of all the areas comprised in Gujarat State. The progress of the Third Plan was quite satisfactory in spite of stresses and strains due to Chinese and Pakistani agressions during this period and a severe drought in the last year of the Plan. As against the projected outlay of Rs 236.50 crores, the actual expenditure was of the order of Rs. 240 crores. During the Annual Plan periods from 1966-67 to 1968-69, an expenditure of Rs. 206.55 crores was incurred. Efforts during the three Annual Plans were directed towards completion of continuing schemes and maintaining the tempo of development. The Fourth Five Year Plan (1969-74) envisages an outlay of Rs. 455.22 crores. During the first two years (1969-71), an expenditure of Rs. 170 61 crores was incurred (tentative figure) against the proposed outlay of Rs. 161 96 crores.

2.1.3 During the last 20 years of planning, the State has made remarkable progress in several sectors of its economy. Basic facilities like irrigation, power and transport which are essential for agricultural and industrial development have been expanded. Valuable mineral

deposits have been opened up to feed industries. Human resources have been augmented through the provision of facilities for education and health. The progress achieved in some of the more important sectors is discussed in the following paragraphs.

Agriculture

2.2.0 The gross cropped area was 101.88 lakh hectares at the end of the Third Plan and 104.20 lakh hectares in 1967-68. Table 1 below indicates the annual average areas under different crops during each of the Plan periods :—

TABLE 1

(Figures in lakh hectares)

Period			Foodgrains	Oilseeds	Cotton	Tobacco
1951-56	..	..	55.86	11.93	13.72	0.60
1956-61	..	..	49.80	18.99	17.50	0.81
1961-66	..	..	47.96	23.44	17.56	0.86
1966-69	..	..	50.78	21.30	16.58	0.86
1969-70	..	..	47.86	19.33	16.47	0.89
1970-71	..	..	51.01	19.66	15.82	0.87

Table 2 below shows the annual average areas under the main food crops and groundnut during the different Plan periods :—

TABLE 2

(Figures in lakh hectares)

Period			Paddy	Wheat	Bajri	Jowar	Maize	Groundnut
1951-56	..	..	4.70	3.82	20.95	15.58	2.00	8.54
1956-61	..	..	5.26	4.62	15.56	13.90	1.98	16.38
1961-66	..	..	5.46	4.34	14.81	13.58	2.34	21.33
1966-69	..	..	5.01	4.94	17.61	13.42	2.68	18.99
1969-70	..	..	4.87	4.33	16.58	13.15	2.69	17.48
1970-71	..	..	4.89	5.77	17.82	13.34	2.74	17.58

The above tables show a considerable shift of the area under food crops in favour of non-food crops. The area under food crops steadily declined from 55.86 lakh hectares in the First Plan period to 47.96 lakh hectares in the Third Plan period, whereas the area under groundnut rose from 8.54 lakh hectares to 21.33 lakh hectares during the same period and thereafter the area under food crops has registered an increase whereas the areas under groundnut and cotton have shown marginal decline. The area under tobacco, which is confined to a few districts in Central Gujarat, increased from 0.60 lakh hectares during the First Plan period to 0.81 lakh hectares during the Second Plan period and has shown only a marginal increase thereafter.

2.2.1 Agricultural production in the State has shown substantial increase as will be seen from the table 1 below which indicates the annual average production of different crops during the different Plan periods :—

TABLE 1

Period	Foodgrains (in lakh tonnes)	Oil-seeds (in lakh tonnes)	Cotton (in lakh bales of 180 kg each)
1950-51	16.36	4 67	7.32
1951-56	18.75	4 40	8 34
1956-61	20 28	11 06	10 55
1961-66	25.79	13 58	14.39
1966-69	27.43	11 11	14 50
1969-70	30.89	11 63	15 52
1970-71	44.06	19.43	15 71

The above table clearly shows that foodgrains production has steadily increased inspite of a considerable shift of the area in favour of non-food crops. The production of food-grains has reached a record figure of 44 lakh tonnes in 1970-71 Though better cultivation practices did contribute to increases in agricultural production, favourable monsoons were a major reason for increased production during these years Table 2 below shows the annual average yield of different crops per hectare during the different Plan periods :—

TABLE 2

(Kg per hectare)

Period	Total food-grains	Total oil-seeds	Cotton	Tobacco
1951-56	333	362	107	679
1956-61	407	586	108	692
1961-66	538	581	147	963
1966-69	536	519	158	1,032
1969-70	615	602	170	1,125
1970-71	864	958	179	1,301

The average yield of foodgrains per hectare has risen from 333 kgs. in the First Plan period to 864 kgs. in 1970-71. Similarly the average yields per hectare of oil-seeds, c‹

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deposits have been opened up to feed industries. Human resources have been augmented through the provision of facilities for education and health. The progress achieved in some of the more important sectors is discussed in the following paragraphs.

Agriculture

2.2.0 The gross cropped area was 101.88 lakh hectares at the end of the Third Plan and 104.20 lakh hectares in 1967-68. Table 1 below indicates the annual average areas under different crops during each of the Plan periods :—

TABLE 1

(Figures in lakh hectares)

Period	Foodgrains	Oilseeds	Cotton	Tobacco
1951-56	55.86	11.03	13.72	0.60
1956-61	49.80	18.99	17.50	0.81
1961-66	47.96	23.44	17.56	0.86
1966-69	50.78	21.30	16.58	0.86
1969-70	47.86	19.33	16.47	0.89
1970-71	51.01	19.66	15.82	0.87

Table 2 below shows the annual average areas under the main food crops and groundnut during the different Plan periods :—

TABLE 2

(Figures in lakh hectares)

Period	Paddy	Wheat	Bajri	Jowar	Maize	Groundnut
1951-56	4.70	3.82	20.95	15.58	2.00	8.54
1956-61	5.26	4.62	15.56	13.90	1.98	16.38
1961-66	5.46	4.34	14.81	13.68	2.34	21.33
1966-69	5.01	4.94	17.61	13.42	2.68	18.99
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The above tables show a considerable shift of the area under food crops in favour of non-food crops. The area under food crops steadily declined from 55.86 lakh hectares in the First Plan period to 47.96 lakh hectares in the Third Plan period, whereas the area under groundnut rose from 8.54 lakh hectares to 21.33 lakh hectares during the same period and thereafter the area under food crops has registered an increase whereas the areas under groundnut and cotton have shown marginal decline. The area under tobacco, which is confined to a few districts in Central Gujarat, increased from 0.60 lakh hectares during the First Plan period to 0.81 lakh hectares during the Second Plan period and has shown only a marginal increase thereafter.

2.2.1 Agricultural production in the State has shown substantial increase as will be seen from the table 1 below which indicates the annual average production of different crops during the different Plan periods :—

TABLE 1

Period	Foodgrains (in lakh tonnes)	Oil-seeds (in lakh tonnes)	Cotton (in lakh bales of 180 kg. each)
1950-51	16.36	4 67	7.32
1951-56	18.75	4 40	8 34
1956-61	20 28	11 06	10 55
1961-66	25 79	13.58	14 39
1966-69	27 43	11.11	14 50
1969-70	30.89	11 63	15 52
1970-71	44 06	19 43	15 71

The above table clearly shows that foodgrains production has steadily increased inspite of a considerable shift of the area in favour of non-food crops. The production of food-grains has reached a record figure of 44 lakh tonnes in 1970-71. Though better cultivation practices did contribute to increases in agricultural production, favourable monsoons were a major reason for increased production during these years Table 2 below shows the annual average yield of different crops per hectare during the different Plan periods :—

TABLE 2

(Kg per hectare)

Period	Total food-grains	Total oil-seeds	Cotton	Tobacco
1951-56 ..	333	362	107	679
1956-61 .	407	598	109	692
1961-66	539	581	147	963
1966-69 ..	536	619	159	1,032
1969-70 .. .	615	602	170	1,125
1970-71	864	958	179	1,301

The average yield of foodgrains per hectare has risen from 333 kgs. in the First Plan period to 864 kgs in 1970-71. Similarly the average yields per hectare of oil-seeds, cotton

and tobacco have also shown substantial increases. Table 3 below shows the rates of growth of production and productivity of different crops during the period 1949-50 to 1969-70 :—

TABLE 3

Crop		Linear growth rate (per cent)		Compound growth rate (per cent)	
		Production	Productivity	Production	Productivity
Total foodgrains	..	5.55	6.75	3.8	4.3
Total food crops	..	6.06	6.62	4.1	3.8
Groundnut ..	..	22.36	1.72	9.1	1.5
Cotton ..	..	9.00	3.51	5.2	2.8
Tobacco ..	..	9.66	3.70	5.9	3.0
Total non-food crops	..	10.91	2.72	5.9	2.3

The linear rate of growth of foodgrains production was 5.55 per cent and the compound growth rate was 3.8 per cent, whereas productivity in regard to foodgrains increased at a linear growth rate of 6.75 per cent and compound rate of 4.3 per cent. The groundnut production increased at the linear growth rate of 22.36 per cent, which is mainly due to the increase in the area under this crop. The linear growth rates for cotton and tobacco productions are 9 per cent and 9.66 per cent whereas the linear growth rates of productivity are 3.51 per cent and 3.7 per cent respectively. The linear growth rate for all non-food crops has been 10.91 per cent which is much higher than the rate for food crops inspite of lower growth in the rate of productivity. This is obviously due to the shift of large areas from food crops to non-food crops.

2.2.2 Bajri, paddy, jowar, maize, wheat, pulses and other foodgrains respectively contributed 35.8 per cent, 13.6 per cent, 11.3 per cent, 10.1 per cent, 21.3 per cent, 3.7 per cent and 4.2 per cent of the total foodgrains production in 1970-71. Bajri, growing in light soils and low rainfall areas, has a special place in Gujarat. A large area under bajri is concentrated in Banaskantha and Kutch districts. The advent of hybrid bajri has made a tremendous impact. The production of bajri is likely to exceed the State's requirements of this foodgrain ; the possibilities of export to other parts of the country are limited ; therefore, new uses will have to be found such as cattle feed. Wheat is grown both under irrigated and unirrigated conditions, the productivity in irrigated area being much higher. Wheat and cotton have attracted most of the irrigated area in the State. Paddy has attracted farmers because of high productivity and attractive prices. Jowar, grown mostly as a fodder crop, has low productivity and as yet a high yielding variety has not created a significant impact. Maize, grown mainly in Panchmahals and Sabarkantha districts, has a high level of productivity. Improvement in the productivity of pulses has not been significant but it is expected that efforts in progress for evolving high yielding varieties may meet with early success.

2.2.3 The important oilseeds of Gujarat are groundnut, sesamum and castor, groundnut being the most dominant. The groundnut production increased during the first three Five Year Plans on account of increased area under the crop. There was a slight decline in productivity in the Third Plan period. No significant breakthrough has been achieved in improving the variety of groundnut and sesamum in terms of yield. Improvement has, however, been effected in the variety of castor. The hybrid castor has been recently released and the area under this crop is likely to increase further.

2.2.4 Quality has received more emphasis in cotton than in other crops. Short staple cotton constituted nearly two-thirds of the total cotton production in the forties whereas now is about 18 per cent, the rest being medium, long, superior and extra-long staple cotton. Gujarat produces more than 50 per cent of the country's medium staple cotton, nearly 30 per cent

of the superior long staple cotton and nearly 59 per cent of the extra-long staple cotton. Most varieties under long staple and extra-long staple cotton are irrigated. The high yielding cotton variety V-797 and hybrid cotton-4 have been released recently. Cotton will, therefore, continue to attract a large share of the irrigated area.

2.2.5 The table below shows the foodgrains deficit in the State during different periods.—

TABLE

Population and estimated foodgrains requirement in Gujarat

Period	Population (in crores)	Adults @88 per cent (in crores)	Annual				
			Human food requirement @19 ozs (in lakh tonnes)	Seed and other requirements (in lakh tonnes @10 per cent of production)	Total requirements (in lakh tonnes)	Feed production (in lakh tonnes)	Deficit (in lakh tonnes)
1	2	3	4	5	6	7	8
1956-61	2.06	1.81	35.58	2.03	37.61	20.28	17.33
1961-66	2.36	2.08	40.90	2.68	43.45	25.79	18.69
1966-69	2.54	2.24	44.04	2.74	46.68	27.43	19.35
1969-70	2.60	2.29	45.02	3.09	48.11	30.89	17.22
1970-71	2.67	2.35	46.30	4.41	50.71	44.06	6.65
1973-74	2.93	2.58	50.82	4.42	53.24	44.19	11.05

Note—Production figures in the first three rows indicate the annual average production during corresponding periods

2.3 Creation of food zones and restriction on movement of foodgrains coupled with food shortages created conditions conducive to high prices. They also provided the impetus to the State to plan vigorously for achieving near self-sufficiency. Introduction of high yielding varieties offered a further incentive for increased foodgrains production. As a result, the area under foodgrains stopped declining and registered a distinct trend towards increase during the past few years

2.4 For each of the crops like paddy, wheat, bajri, jowar, maize and hill-millets, research stations have been established supported by sub-stations and regional laboratories in various agro-climatic zones. Special efforts are being made to evolve new varieties. A major break-through has been made in bajri and cotton, but more intensive research is called for in ground-nut and pulses. The Fourth Plan envisages an outlay of Rs. 347 lakhs on agricultural research.

2.5 Agricultural education has progressed steadily in the State. There are three agricultural colleges, with intake capacity of 450 seats, and 13 agricultural schools which are being strengthened. It has been decided to establish an Agricultural University during the Fourth Plan Facilities for specialised training are available in the colleges. There are four training centres for upgrading courses for village level workers. The Fourth Plan envisages an outlay of Rs. 176 lakhs on agricultural education besides such central assistance as will be available for the Agricultural University.

2.6 For supply of improved seeds, 142 seed farms have been established. Seed production and distribution are organised at all stages and inspections are carried out to ensure the purity and quality of seeds. The seed testing laboratories are being strengthened to enable them to test samples of all crops. It is expected to cover an area of 35.48 lakh hectares under improved seeds by the end of the Fourth Plan and out of this an area of 16.75 lakh hectares is expected to be covered under high yielding varieties. The Fourth Plan envisages an outlay of Rs. 51.08 lakhs on improved seeds programmes.

2.7 Increased consumption of chemical fertilisers and large scale production of organic manure are essential to obtain increased production without adversely affecting soil productivity. The target for the Third Plan period could not be achieved as shown in the table below :—

TABLE

(in lakh tonnes)

Sr. No.	Manure / Fertiliser	Target	Achievement
1	Nitrogenous (Ammonium)	3.00	1.41
2	Superphosphate	0.90	0.66
3	Potassic (K_2O)	0.05	0.03
4	Urban compost	2.00	1.29
5	Rural compost	2.00	1.95

However, substantial increases in the consumption of fertilisers have been registered during recent years and it is expected that by the end of the Fourth Plan, the consumption of fertilisers will rise up to 16.00 lakh tonnes of ammonium sulphate, 4.2 lakh tonnes of superphosphate and 0.07 lakh tonnes of K_2O. Similarly, the production of compost is expected to rise up to 4.72 lakh tonnes and the area under green manuring is expected to rise up to 2.11 lakh hectares. The Fourth Plan envisages an outlay of Rs. 34 lakhs on schemes for manures and fertilisers.

2.8 The package programme under intensive agriculture was introduced in Surat district (now bifurcated into Surat and Bulsar) in the Third Plan period and subsequently extended to Kaira and Junagadh districts and parts of Mehsana, Banasktnha, Bhavnagar and Rajkot districts in the areas having irrigation facilities. It is expected to cover an area of 20.27 lakh hectares under intensive agriculture by the end of the Fourth Plan, the outlay on this programme being Rs. 146.42 lakhs.

2.9 In order to protect crops from pests and diseases, schemes for supplying plant protection appliances and subsidy for insecticides, pesticides and fungicides have been continued. In order to make plant protection measures more effective, aerial spraying on area basis at subsidized rates has also been introduced. It is expected to cover an area of 3.65 lakh hectares under plant protection measures by the end of the Fourth Plan, including 1.2 lakh hectares to be covered under aerial spraying. The Fourth Plan envisages an outlay of Rs. 51.60 lakhs on plant protection schemes.

2.10 The schemes for development of commercial crops like oilseeds, tobacco, sugar-cane and cotton and of horticultural crops including coconut, undertaken in the Third Plan, have been continued and expanded during subsequent years. The Fourth Plan envisages an outlay of Rs. 165 lakhs on development of commercial and horticultural crops.

2.11 With a view to demonstrating the use of irrigation water and its practices, 15 trial-*cum*-demonstration farms have been set up in command areas of irrigation projects. Levelling of undulating lands in the command of major irrigation projects is also receiving attention to ensure economic use of irrigation water. The Fourth Plan envisages an outlay of Rs. 99 lakhs on ayacut development programme.

2.12 The necessity of integrated area development in the commands of irrigation projects has been realised and a well integrated agricultural support programme has been taken up in the command area of Kadana Project in order to ensure optimum benefits from the project. The expenditure incurred on this programme is to be reimbursed by the Gujarat State Co-operative Land Development Bank which will recover the cost from the beneficiary farmers in instalments.

Land Development

2.13 The programme of land development in the Fourth Plan includes the schemes of consolidation of holdings, survey and classification in Kutch, re-survey or revision survey, reconstruction of torn records, and measurement of traverse kharaba lands in Saurashtra districts. The schemes of survey and classification in Kutch and measurement of traverse kharaba in Saurashtra will be completed during the Fourth Plan which envisages an outlay of Rs. 100 lakhs on all the schemes under land development.

Soil Conservation

2.14 Soil conservation measures occupy an important place in Gujarat, particularly because of the extent of soil erosion by winds and surface run off that takes place continuously in different parts of the State. The progressive achievement of contour bunding was 7.8 lakh hectares at the end of 1968-69 and the progressive target by the end of the Fourth Plan is 12.11 lakh hectares which is expected to be achieved as the progressive achievement at the end of 1970-71 is 9.7 lakh hectares. It is also expected to cover an area of 4 lakh hectares under survey by the end of the Fourth Plan. The Fourth Plan envisages an outlay of Rs. 10 crores on soil conservation works. The soil conservation schemes include, among others, schemes for afforestation and reclamation of kotar lands, development of khar lands and desert afforestation, and soil and moisture conservation and afforestation of denuded areas.

Minor Irrigation

2.15 The minor irrigation programme comprises surface irrigation wells, pumping sets, tanks and bandharas, tubewells, co-operative lift irrigation schemes, and the Land Development Bank's loaning programme to cultivators for construction of wells and installation of pumpsets.

2.16 An amount of Rs. 13.44 crores was spent on minor irrigation schemes during the Third Plan (1961-66) and an amount of Rs. 19.71 crores was spent during the three Annual Plans (1966-69). The Fourth Plan outlay on minor irrigation is Rs. 30 22 crores, out of which an amount of Rs. 13.28 crores has been spent during the first two years (1969-71).

2.17 The Fourth Plan targets of new irrigation wells and pumpsets are 86,500 and 80,500 respectively, the progressive targets at the end of the Fourth Plan being 6.11 lakhs and 2.10 lakhs respectively. During 1969-70, 21,308 new wells were constructed and 22 393 new pumpsets were installed. The cumulative achievement in respect of wells and pumpsets at the end of 1971-72 is expected to be 5.78 lakhs and 1.75 lakhs respectively. 1,039 schemes of tanks and bandharas were completed by 1970 and 1448 tubewells were completed by the end of 1970-71. The table below shows the progressive physical achievements of minor irrigation schemes in terms of irrigation potential and utilisation :—

TABLE

P—Potential
U—Utilisation
(Figures in lakh hectares)

Sr. No	Programme	Progressive achievement 1969-70 P	1969-70 U	1970 71 P	1970 71 U	1973-74 (target) P	1973-74 (target) U
1	Tanks and bandharas .	1 60	1.08	1.71	1.14	2.03	1 30
2	Government tubewells	0 69	0 41	0.72	0 43	0 84	0 54
3	Wells, pumping sets, etc.	13 24	10.20	14 22	11 00	17.50 (items 3 and 4)	14.01 (items 3 and 4)
4	Co-operative lift irrigation.	0 28	0 20	0 29	0 21		
	Total .	15.81	11 89	16 94	12.78	20 43	15 85

2.18 Some additional allocations for minor irrigation schemes have been made for the economically backward talukas and also under a special programme of grant-in-aid to district panchayats for specially selected works.

2.19 Some additional minor irrigation schemes are also taken up under the centrally sponsored rural works programme for chronically drought affected areas. 100 tubewells are proposed to be constructed under this programme up to 1973-74 creating a potential of 0.08 lakh hectares (utilisation being 0.05 lakh hectares).

2.20 The State Government have been giving careful attention to the systematic, scientific and comprehensive survey and economic utilisation of water resources of the State. Till recently the investigation of ground water resources of the State was being done by different agencies. The Government have created a Directorate of Ground Water Investigation which is now responsible for all investigation work in this direction. This directorate is now being strengthened. An area of 16,822 sq. kms. has been investigated up to March 1971 and this figure is expected to rise to 21,883 sq. kms. by the end of the Fourth Plan.

Major and Medium Irrigation

2.21.1 47 major and medium schemes were completed by the end of 1970-71 and 29 schemes were continued as spill over during the current year. 53 schemes in all are expected to be completed by the end of the Fourth Plan and 50 schemes will be continued as spill over during the Fifth Plan. The total expenditure on multipurpose, major and medium irrigation schemes up to the end of 1970-71 is Rs. 181.72 crores. The total Fourth Plan outlay is Rs. 110 crores (including flood control) out of which an amount of Rs. 34.54 crores has been spent during the first two years (1969-71).

2.21.2 The irrigation potential created by major and medium irrigation schemes at the end of 1970-71 is 5.14 lakh hectares which is expected to rise to 8.08 lakh hectares (reappraised figure) by the end of the Fourth Plan, which is only 15.9 per cent of the cultivable area of the State as against the all India target of 26.1 per cent at that time. The utilisation at the end of 1970-71 was only 3.65 lakh hectares and it is expected to rise to 6.16 lakh hectares by the end of the Fourth Plan.

Animal Husbandry and Dairying

2.22 Though significant results have been achieved in certain fields, the vast potential of animal husbandry remains, by and large, to be tapped. Progress is hampered by the existence of a large number of uneconomic and surplus cattle, by the extent of deficient nutrition among useful cattle and by shortage of breeding stock.

2.23 Four cattle feed factories have been established and a veterinary college exists for training personnel for manning various programmes. A dairy science college has also been established to meet the requirements of professional skills in dairy development programmes.

2.24 Several schemes are under implementation for development of cattle, poultry, sheep and other livestock as well as for the development of veterinary services.

2.25 It has been the Government policy to encourage dairying on co-operative lines in order to make milk available to the urban consumer at reasonable rates and to ensure a fair price to the rural producer. Wherever possible, Government dairy plants were handed over to co-operative organisations, either on onwership basis or for management. Nine co-operative milk unions and 1649 primary milk producers' societies with a membership of 2·85 lakhs came into being by the end of 1970.

2.26 The expenditure on Animal Husbandry and Dairy Development was Rs. 149 lakhs and Rs. 381 lakhs respectively during the Third Plan and Rs. 207.12 lakhs and Rs. 280·02 lakhs respectively during the Annual Plans (1966-69). The Fourth Plan outlay is Rs. 675 lakhs on Animal Husbandry and Rs. 175 lakhs on Dairy Development.

Forests

2.27 The forest area in Gujarat is only 8 8 per cent as against the requirement cent according to the National Forest Policy. A substantial portion of this area co grass lands and sizeable areas have also been subjected to illicit cultivation. A nu useful schemes have been undertaken for the protection of forest and wild life as well plantation.

2.28 The scheme of economic plantations of teak, khair and bamboo was implem in 15,979 hectares by the end of 1968-69 and a further area of 12,595 hectares is to be bro under such plantations during the Fourth Five Year Plan.

2.29 The scheme of plantations in coastal area was implemented in 3,955 hectares by t end of 1968-69 and a further area of 1,700 hectares is to be covered during the Fourth Pla

2.30 The scheme of plantation of fast growing species was implemented in 10,001 hectares by the end of 1968-69 and an additional area of 13,800 hectares is to be covered during the Fourth Plan period. There are several other schemes such as roadside and canalside plantations, farm forestry, forest research, forest protection, conservation of wild life

2.31 Certain useful schemes like afforestation of ravine lands, desert afforestation and afforestation of denuded areas are implemented under soil conservation sector. Afforestation in Dantiwada river valley project, afforestation in Santalpur desert area, and afforestation and grass land development in chronically drought affected areas are also taken up under centrally sponsored and central sector programmes

2 32 An expenditure of Rs. 158 lakhs was incurred during the Third Plan and Rs 162 60 lakhs during the three Annual Plans The Fourth Plan envisages an outlay of Rs 350 lakhs under this sector.

Fisheries

2.33 The present level of annual fish production of about 1.5 lakh tonnes is mainly due to the planned efforts for encouraging local fishermen financially and technically to adopt modern methods of mechanised fishing. The investment during the First Plan was a meagre amount of Rs. 44 lakhs but it kindled a desire amongst fishermen to develop their industry A sum of Rs. 66 73 lakhs was spent during the Second Plan and a noticeable step was taken towards mechanisation and modernisation of fishing crafts. During the Third Plan, an amount of Rs 125 lakhs was spent against the stipulated outlay of Rs. 129 lakhs. As against the target of 200 in-board engines, 403 engines were distributed. 481 outboard motors, 339 improved boats and 9 carrier launches were also distributed. Annual fish production rose from 0 50 lakh tonnes in 1960-61 to 1.10 lakh tonnes at the end of the Third Plan and to 1.31 lakh tonnes at the end of 1968-69 An amount of Rs 133 17 lakhs was spent during the three Annual Plans (1966-69)

2.34 The Fourth Plan (1969-74) envisages an outlay of Rs. 350 lakhs and fish production is expected to rise to 2 lakh tonnes by the end of the Fourth Plan Besides this, a sum of Rs. 55 lakhs will be spent on development of fishing harbours under a centrally sponsored programme At the end of the Fourth Plan, there will be 2,100 mechanised fishing boats, out of which 10 per cent will be engaged in trawler fishing, increasing the yield of export varieties f fish

rehousing and Marketing

2 35 The development activities under this sector aim at (i) encouraging sale of market- surplus of agricultural commodities through regulated markets, particularly in backward to ensure fair price to the producer, and (ii) development of warehousing facilities h construction programmes of the Central and State Warehousing Corporations. It is

expected to regulate 30 markets during the Fourth Plan period, raising the number of regulated markets to 254 by the end of the Fourth Plan. The progressive targets of storage capacity at the end of the Fourth Plan period are 2.30 lakh tonnes and 0.80 lakh tonnes for co-operative societies and warehousing centres respectively against the progressive achievement of 1.73 lakh tonnes and 0.50 lakh tonnes at the end of 1968-69. The Fourth Plan envisages an outlay of Rs. 100 lakhs on warehousing and marketing.

Co-operation

2.36 Co-operation in its institutional form came to be introduced in this country for the first time when the first Co-operative Societies Act was passed in 1904 by the Government of India. In its true form co-operation is a voluntary movement and people should organise their activities on co-operative basis only if they feel the need. In other words, the urge for co-operation should come from within. Due to special circumstances prevailing in the country, the movement was introduced by the Government. The movement has passed through different stages of development and ultimately it has come to be recognised as a medium through which various economic activities can be executed. As co-operation is a voluntary activity, co-operation and planning might not reconcile with each other. As, however, co-operation in India was not only a creed to be voluntarily practised by the people, if they so choose, but a definite policy adopted by Government with certain ends in view, it was found necessary that co-operation should progress and develop according to the needs in other spheres. The first attempt for planning in co-operation was therefore made as back as 1944 when a committee under the Chairmanship of Shri R. G. Saraiya gave a report giving details about co-operative planning and targets to be realised. Thus planning in co-operation was conceived even before economic planning was actually taken up on hand.

2.37 Any plan must set forth broad objectives and maximum scope of development within which frame work planning for a particular period should be attempted. As far as the broad objective is concerned, it can well be said that co-operation has no boundary and hence the scope of development could be unlimited till it embraces every individual and every economic activity.

2.38 The provision of credit facilities for agricultural production formed the main plank for co-operative development programme. The objective of covering all villages by primary co-operative credit scoieties has been almost fully achieved. There are 22.41 lakh *khatedars* in the State. Against this, membership of agricultural credit societies stood at 11.40 lakhs by the end of the Third Plan and at 12.73 lakhs at the beginning of the Fourth Plan. The target of 15.50 lakhs by the end of the Fourth Plan is expected to be achieved.

2.39 The Fourth Plan target of Rs. 75 crores for short and medium term loans has already been exceeded and the co-operative credit structure has been well established. However, efforts will have to be made to revitalise dormant and weak societies and to amalgamate non-viable societies. Special assistance is given to village co-operatives and central co-operative banks for financing weak farmers, and to banks for opening branches in economically backward areas. The Fourth Plan target of Rs. 90 crores for long term loans is also likely to be exceeded.

2.40 The Government has been encouraging marketing and processing of agricultural produce through co-operative societies. Subsidy is given to societies for construction of godowns, 1509 godowns having been sanctioned under the scheme by 1969-70. The Fourth Plan target is to assist 14 large size, 40 medium size and 400 small size godowns.

2.41 149 processing societies were organised by 1969-70. The Fourth Plan target is to organise 39 processing societies by giving assistance. Cotton ginning and pressing (in South Gujarat) and sugar production have found a very favourable climate in the co-operative sector in Gujarat.

2.42 There are several other schemes like co-operative training and education, executed through the co-operative council, co-operative farming societies, consumers societies, labour

contract societies etc. which receive financial assistance and professional guidance from the Government.

2.43 The expenditure on co-operation was Rs. 357 lakhs (including warehousing and marketing) during the Third Plan and Rs. 233.84 lakhs during the Annual Plans (1966-69). The Fourth Plan outlay is Rs 500 lakhs, out of which an amount of Rs. 239.28 lakhs has been spent during the first two years (1969-71).

State's Income

2.44 ' Agriculture and allied activities ' contributed about 52 per cent to the National Income in 1960-61, and in the period 1960-61 to 1967-68, the contribution from this sector of the economy has declined from 52 per cent to 43 per cent. In the estimates of State Domestic Production (State Income) of Gujarat, the share of 'Agriculture and allied activities' (Rs. 307 crores) was 41.6 per cent in 1960-61 and has varied from 34.1 per cent in 1968-69 to 43.2 per cent in 1964-65. The estimates show wide fluctuations from year to year which are mainly accounted for by the influence of weather and rainfall conditions. Further analysis of the data reveals a healthy trend of development and the average of annual rates of growth of income from this sector (at 1960-61 prices) works out to about 4 per cent. The development programmes in the Fourth Plan are expected to further build up the potential of growth in this sector, in turn raising the contribution from this sector to Rs. 556 crores in 1973-74 at 1960-61 prices. According to these estimates, the contribution from this sector in 1973-74 will constitute about 40 per cent of the total State Domestic Production in that year.

2.45 Within the sector ' Agriculture and allied activities', major contribution naturally emanates from the sub-sector ' Agriculture and Animal Husbandry '; this has accounted for 97 to 98 per cent of the State Domestic Production under ' Agriculture and allied activities.' The remaining two to three per cent of the output is shared between ' Forestry ' and ' Fisheries'. Separate estimates of ' Agriculture ' and ' Animal Husbandry ' are not being prepared following the methodology adopted for the preparation of national estimates. An indication of the production of contribution from these two sub-sectors may therefore be obtained by relating the gross value of outputs of these sub-sectors According to this calculation, the ratio of outputs from ' Agriculture ' and ' Animal Husbandry ' works out at 4:1 Looking to the technical feasibilities of growth, it is felt that structural changes in respect of the proportions of contributions from the four sub-sectors, *viz*., Agriculture, Animal Husbandry, Forestry and Fisheries, in the total contribution from the sector ' Agriculture and allied activities ' will only be marginal, if any.

CHAPTER III

AGRICULTURE

3.1 Introduction

3.1.1 The land utilization statistics (Table in para 1.8.0) show that about 52.9 per cent of the total reporting area of the State in 1967-68 was sown. This leaves little scope for increasing the area under cultivation except through reclamation of ravines / deserts and through double cropping following increase in irrigation facilities. The exploitable water resources of the State being very limited, the scope for increasing the irrigation potential is limited. The soils of North Gujarat are subject to wind erosion, whereas the soils in South-Central Gujarat are subject to erosion by heavy surface run off. Water conservation and efficient use and management of water, soil and moisture conservation, and scientific dry farming methods, therefore, are of crucial importance in the agricultural situation of this State.

3.1.2 The progress of agriculture in the State has been discussed in detail in Chapter II above. Foodgrains production has steadily increased in spite of a shift of considerable area from food crops in favour of non-food crops. The high yielding varieties of bajri and maize have been developed but the high yielding varieties of jowar and pulses are yet to be developed. It is expected that high yielding and short duration pulses will be developed in near future. Efforts in improving the variety of groundnut, however, have not met with any appreciable success so far. The success achieved in evolving a high yielding hybrid cotton is likely to result in an increased area under irrigation being brought under cotton. Bajri, groundnut, cotton and tobacco have been found to be suitable to local soil and climate.

3.1.3 Agricultural credit and efficient inputs organisation are essential for agricultural progress. It is fortunate that, in Gujarat, the co-operative structure has been established on solid grounds and is, by and large, strong enough to provide a credit and inputs organization which would ensure the success of agricultural development programmes.

3.2 Objectives for the Fifth and Sixth Plans

3.2.1 The regional characteristics affecting food and non-food crops should essentially form the basis for a long term perspective for Gujarat. The soil and climate of Gujarat being suitable for cotton, groundnut, tobacco and bajra, the objective for the future Plan of Gujarat should be to maximise productivity of these crops.

3.2.2 Foodgrains

In regard to type of foodgrains, the tendency usually is for substitution of inferior cereals by superior cereals. Such substitution is possible where irrigation becomes available. Bajri, one of the common inferior cereals, however, is ideally suited to dry farming and low rainfall areas. Its substitution by superior cereals will not be feasible and even a rainfed crop like groundnut cannot replace it in certain districts and in certain soil types. In any future Plan, therefore, bajri cultivation will continue to take place on a large scale. As the development of high yielding varieties of pulses is not far off, short duration pulses may possibly substitute bajri in some measure and increased production of pulses should be planned. As more than 52 per cent of the total reporting area (1967-68) is under cultivation, the extent of additional area (if any) available for cultivation will be negligible. The gross cropped area will increase as a result of double cropping following improvement in irrigation facilities but such increases will be limited on account of the exploitable water resources of the State being very limited; as and when the Narmada Project becomes a reality the position may well change. It is, therefore,

imperative for us to secure maximum yield per hectare and the aim and the projection of foodgrains production should be based on improvement in productivity. The objective during the Fifth and Sixth Plans should be to achieve growth in the productivity of total foodgrains at the linear rate of 8 per cent as against the current rate of 6.75 per cent (for the period 1949 50 to 1969-70). In terms of foodgrains production the objective would be annual foodgrains production of 60 lakh tonnes and 80 lakh tonnes by the end of the Fifth and Sixth Plans respectively (base of 44 lakh tonnes of Fourth Plan).

3.2.3 Oilseeds

3.2.3.1 The improvement in the variety of groundnut has not been of the same order as in cereals and cotton. Indications are also not available for the development of the high yielding variety of groundnut in near future. In the Fourth Plan period an amount of Rs. 17 lakhs is provided for research on oil seeds in the State Plan and an additional amount of Rs. 11 88 lakhs is expected to be provided by the I. C. A. R. Compared to crops of similar importance investment has not been lower but the inherent difficulties in improvement of groundnut have made substantial achievement difficult. Gujarat State has a special interest in its improvement and therefore massive investments in research on groundnut and other oil seeds should be planned by the State. It is suggested that outlays of Rs. 50 lakhs and Rs. 75 lakhs should be provided for research on oil seeds during the Fifth and Sixth Plans respectively.

3.2.3.2 The linear rate of growth in the productivity of groundnut is as low as 1.72 per cent (for the period of 1949-50 to 1969-70). Looking to immediate technical feasibility there can only be a marginal increase in productivity during the next decade. This can be placed at at 2 per cent in the Fifth Plan and may increase to 3 per cent in the Sixth Plan period. The annual production of oil seeds can therefore be expected to reach 19.65 lakh tonnes in the Fifth and 22 lakh tonnes in the Sixth Plan.

3.2.3.3 In the past few years the feasibility of growing new oilseed crops of soyabean and sunflower has been demonstrated. The precise areas in which these crops will be successfully grown as substitute crops are under exploration. Such substitution will improve production marginally. It may help stabilization of production of oilseeds which at present has shown wide fluctuation. It is proposed to encourage production of soyabean as an alternative source for edible oil. It is proposed to grow soyabean as inter crop in an area of about 40,000 hectares in the Fifth Plan and 80,000 hectares in the Sixth Plan. This will contribute annually about 35,000 tonnes of soyabean in the Fifth and 1,00,000 tonnes in the Sixth Plan. This will raise the total annual oil seeds production to 20 lakh tonnes by the end of the Fifth Plan and 23 lakh tonnes by the end of the Sixth Plan.

3.2.4 Cotton

The linear rate of growth in productivity of cotton is 3.51 per cent (for the period 1949-50 to 1969-70). This will improve to about 5 per cent during the Fifth and Sixth Plans. This will lead to annual production of 24 lakhs bales (180 kg each) by the end of the Fifth Plan and 30 lakh bales by the end of the Sixth Plan.

3.2.5 Sugarcane

The State Federation of Co-operative Sugar Factories has recently recommended to Government that 17 additional sugar factories should be set up. It is expected that 14 sugar factories will be set up by the end of the Fourth Plan. It is anticipated that total irrigation potential of 46 61 lakh hectares under all major, medium and minor irrigation schemes will be created by the end of the Fifth Plan. Though the potential of perennial irrigation cannot be anticipated, it can be safely assumed that adequate facilities will be created for supporting establishment of 8 additional sugar factories in the Fifth Plan and 8 in the Sixth Plan. The targets of sugarcane production by the end of the Fifth and the Sixth Plans are accordingly fixed at 7 lakh tonnes and 10 lakh tonnes (in the form of gur) as against the target of 4 27 lakh tonnes (in gur) by the end of the Fourth Plan.

3.2.6 Feed and Fodder

Studies have indicated that dairy farming is not viable when milk production per animal is low and irrigation facilities are scarce. It is estimated that fodder crop cultivation occupies only about 9 per cent of the total cropped area and irrigated fodder crops occupy only about 4 per cent of the total irrigated area. Dairy farming might become viable with the introduction of cross breeding programme on a large scale, which will make high-yielding cows available. As the acreage under perennial irrigation is very limited, fodder crop cultivation will have necessarily to face keen competition from cereal and commercial crops. Fodder crop production will, therefore, have to be linked with incentives in a package extension service to be organized by milk unions for dairy development. Increased agricultural production will fully meet the foodgrains requirement of cattle feed factories which are being planned to be adjuncts of dairy plants, run by Milk Union.

3.2.7 Fruits and Vegetables

The growing awareness of the necessity for protective foods will result in increased demand for fruits and vegetables. It is expected that the growth of efficient marketing and processing organizations during the Fifth and Sixth Plans will provide the necessary impetus to increase production of fruits and vegetables. In this context, a few projects for the supply of fruits and vegetables to some selected cities should also be taken up.

3.2.8 Warehousing and Marketing

3.2.8.1 Substantial increases in agricultural produce on account of various agricultural developemnt programmes will result in larger marketable surpluses of agricultural commodities. Additional storage facilities will, therefore, have to be created and adequate marketing facilities arranged. Warehousing and Marketing, in other words, willl have to play a dynamic role in agricultural development in Gujarat in the next decade.

3.2.8.2 Marketable surpluses of agricultural commodities would be sold through properly run regulated markets, where they exist. These should have satisfactory facilities for grading and for obtaining up-to-date information on market intelligence. The programme of regulated markets should, therefore, be strengthened and effective supervision should be developed to ensure efficient conduct of regulated markets.

3.2.8.3 An efficient advisory organization should be developed which would anticipate all possible problems affecting commodity markets, collect necessary intelligence, and give timely advice to the Government on measures that may be necessary to protect the interests of the farmers.

3.2.8.4 Provision of adequate and timely credit being an essential pre-requisite for sustained agricultural growth, and extension of fresh credit being related to repayment of earlier borrowings, linking of credit with marketing is considered essential. Certain agricultural commodities are marketed after processing. For such commodities, marketing and processing being combined activities, credit should be linked with processing and marketing in order to achieve the twin objectives of providing fair prices to the agricultural producers and effecting recovery of loans which will enable provision of fresh credit in the next season.

3.2.8.5 Experience has shown that processing and marketing of certain commodities, *e.g.*, cotton ginning and pressing in South Gujarat and sugar production, have been successfully attempted on the co-operative lines, but experience has not been happy in the co-operative processing and marketing of commodities like groundnut and even cotton in areas other than South Gujarat. The State policy should, therefore, be oriented in conformity with the general objective of increasing production and providing fair prices to the agriculturists by organizing agricultural processing and marketing, wherever feasible, in the co-operative sector, except for crops which, for special reasons, require different handling such as groundnut.

3.2.8.6 The Food Corporation of India will play an important role by way of support prices and buffer stock. The State Government should set up an organization for procurement if the F.C.I. is unable to discharge the functions of price support and buffer stock. Wherever feasible, the co-operative societies may procure the agricultural produce on behalf of the F.C.I. or the State Organisation, as the case may be.

3.2.8.7 Experience shows that groundnut, which is the main oilseed of Gujarat, has been a long standing problem of Gujarat. Ad-hoc solutions have been attempted from time to time, resulting in financial losses to Government and without satisfaction to either the consumers or the farmers. Experience has also revealed that the speculative nature of this commodity makes efficient handling and processing difficult in the co-operative sector. It would be best to let the market forces operate, except for the fixation of support prices for groundnut to safeguard the interests of farmers. The interest of the consumers against unfair increase in price for groundnut oil could be safeguarded by the creation of an adequate buffer stock through purchase in the open market both initially and for replenishment. Releases could be made from the stock into the market whenever there was reason to think that prices were being pushed up for speculative reasons or to take advantage of temporary shortages If this too is not successful, recourse should be had to the final drastic step of setting up a Groundnut Board which will procure the entire produce, process it in a large modern processing and packaging plant, and market the oil.

3.2.8.8 The State Government should cause a detailed study to be made immediately in order to determine the most efficient manner of processing and marketing cotton which is another major crop of the State. The State Government should also consider whether it would be desirable in the interests of farmers, merchants and mills to set up an organization for purchase of cotton by the State on the lines of Maharashtra.

3.2.8.9 The marketing organizations should be organized on commercial lines whether they are boards or corporations or co-operative societies.

3.2.8.10 It is a common experience that the consumer pays a high price and the producer gets a very low price for fruits and vegetables, except certain specific cases like banana in South Gujarat where marketing has been effectively organized on co-operative lines and also linked with credit. A few specific projects should be taken up for supply of fruits and vegetables to certain cities, ensuring fair price to the rural producers and supply to the urban consumers at reasonable rates. Marketing of fruits and vegetables can be successfully handled by co-operative societies or by a Board for Perishables.

3.2.8.11 Shortage of storage space becomes a serious bottleneck in the marketing of agricultural produce and ultimately affects production adversely. Government should encourage construction of additional modern storage to avoid losses on account of bad storage or misuse of storage places.

3.2.8.12 The idea of storage in silos of different sizes at different levels should be pursued vigorously.

3.2.9 Summarizing, the main objectives of agricultural production programme for the Fifth and Sixth Plans are :—

(a) Foodgrains

(i) increasing linear rate of growth of productivity of total foodgrains to 8 per cent from the current rate of 6.75 per cent,

(ii) development of high yielding and short duration varieties of pulses, with a view to achieving their maximum productivity, and

(iii) annual foodgrains production of 60 lakh tonnes by the end of the Fifth Plan and 80 lakh tonnes by the end of the Sixth Plan ;

(b) **Oilseeds**

(i) intensification of research efforts for the development of high yielding varieties of groundnut,

(ii) increasing the linear rate of growth of productivity of groundnut to 2 per cent in the Fifth Plan and 3 per cent in the Sixth Plan from the current rate of 1.72 per cent,

(iii) encouraging cultivation of soyabean as an alternative source of edible oil and cultivation of soyabean as inter-crop in 40,000 hectares in the Fifth Plan and 80,000 hectares in the Sixth Plan, and

(iv) annual oilseeds production of 20 lakh tonnes by the end of the Fifth Plan and 23 lakh tonnes by the end of the Sixth Plan ;

(c) **Cotton**

(i) increasing the linear rate of growth in productivity to 5 per cent from the current rate of 3.51 per cent, and

(ii) annual production of 24 lakh bales (of 180 kgs. each) by the end of the Fifth Plan and 30 lakh bales by the end of the Sixth Plan ;

(d) **Sugarcane**

annual production of 7 lakh tonnes in terms of gur by the end of the Fifth Plan and 10 lakh tonnes by the end of the Sixth Plan ;

(e) **Fodder**

encouraging fodder crop production for dairy animals by providing incentives (given as part of an overall dairy development programme) ;

(f) **Fruits and Vegetables**

encouraging fruit and vegetable production (this will necessitate efficient marketing and processing organizations, whether in the public or private or co-operative sector) ;

(g) **Warehousing and Marketing**

(i) improvement in the working of regulated markets,

(ii) establishment of a directorate of agricultural marketing,

(iii) linking agricultural credit with marketing and processing,

(iv) setting up a State organization if the F.C.I. fails to perform the functions of price support and buffer stock,

(v) procurement of groundnut and cotton by the State, and

(vi) increasing the storage capacity of the co-operative societies and warehousing centres from 2.30 and 0.80 lakh tonnes respectively at the end of the Fourth Plan to 3.05 and 1.20 lakh tonnes by the end of the Fifth Plan and 4.30 and 1.80 lakh tonnes by the end of the Sixth Plan.

3.3 Programmes and Policies for the Fifth and Sixth Plans

The realization of the aforesaid objectives is necessarily dependent on programmes on many fronts such as soil and moisture conservation, increasing ve cover through afforestation, provision of adequate and timely credit, and explo of the surface and underground water resources for irrigation. The first thre dealt with in Chapters IV, VII and IX respectively. The subject of irrigation been dealt with in Part II. Again, the objectives set forth above call for produc oriented policies and programmes in regard to planning and supply of various agricult inputs, education and research and its application to concrete situations, qualitative improvem of extension services and farmers' training in modern agricultural practices, establishme of agro-industries, water conservation and efficient use and management of water, adoption of scientific dry farming methods, fullest use of the small and marginal holdings of the small and marginal farmers, an organizational set-up that will meet the growing demands, and development of adequate and efficient warehousing and marketing facilities. These are discussed in the following paragraphs.

3.3.1 Agricultural inputs

3.3.1.1 It is essential that farmers should get the right inputs in sufficient quantity at the appropriate time. This will require much greater organisational effort. The inputs should be made available to the farmers through private, public sector and co-operative organizations. It would be worthwhile setting up a State Seeds Corporation on the same line as the National Seeds Corporation with similar functions and responsibilities. This is suggested because the importance of improved seeds, their production, multiplication and high degree of supervision, and their testing and certification will become of steadily increasing importance to the farmer. What one must aim at is to assure a farmer that when he buys a packet of certified seed, he gets what is certified and at the right price.

3.3.1.2 It is desirable to lay down standards of different inputs for different crops. Experience regarding the actual use of various inputs and the agricultural production during the past few years has indicated the need for review of the standards of inputs for various crops. Moreover, each farmer has to evolve his own plan of agricultural inputs in the light of his own experience in his fields.

3.3.1.3 A review of the standards of agricultural inputs should be undertaken immediately and the results of this review should form the basis for realistic targets in respect of coverage under improved seeds and high yielding varieties, consumption of manures and fertilizers, and areas to be covered under plant protection measures, improved implements, intensive agriculture, and commercial crops.

3.3.1.4 Plant protection measures are effective when they are undertaken on area basis. Aerial spraying of insecticides, pesticides, fungicides, etc., is the most effective method of plant protection in case of epidemics in one crop areas. For this purpose, close liaison should be maintained with the Government of India for obtaining helicopters, etc., for aerial spray whenever necessary. Plant protection measures on area basis should be undertaken by Government free of cost on the analogy of preventive and curative measures which Goverment takes when pidemic breaks out amongst human beings and/or animals. Suitable sites for helipads and r-strips should also be reserved at appropriate places. Sites for this purpose should be served at Dantiwada, Anand and Junagadh so that, in addition to the needs of aerial aying, they will also serve the proposed Agricultural University.

3.3.1.5 To achieve sustained growth of our economy and to maintain continued interest rmers in improved agricultural technology, it is not enough to establish a supply line of l inputs but it is vitally important to see that the farmers use the right input, in right ty and in right manner with right tools or equipment. While some progress in re

consumable inputs like seeds, fertilizers, pesticides, etc., has been made, no significant efforts have been made for a critical input like farm equipment which constitutes an input of durable variety, demanding high investment and special skills. With the recent break-through in agriculture, the need for farm mechanisation is very great. In several instances this has been recognised as the most critical farm input. The rapidly increasing demand for farm machinery has prompted many manufacturers to take up the production of farm machinery both for pre-harvest and post-harvest operations. With several manufacturers making the same types of farm machinery, need is increasingly being felt of an impartial agency which can assess the comparative worth of machines and guide the farmers correctly in making the right choice of the farm machinery. In order to attend to this very important activity, a "Farm Machinery Testing Centre" should be established in the State. This centre can help the farmers in providing basic guidelines for taking decision on the type of machine to be used for a certain operation, and can assist them in the selection of the best equipment where a choice of make exists on the basis of the evaluation test data collected and published by the centre. In addition to mechanical and engineering tests, such a centre in co-operation with the team of agronomists and the nearest Agricultural Research Station would be able to test the equipment for its field performance also to make certain that the equipment is capable of performing jobs matching with the agronomic needs for a given crop and a given soil. Japan has organized such a centre admirably well at the Institute of Agricultural Machinery, Omiya, where the equipments are not only tested for their engineering mechanism but in co-operation with the nearby Agricultural Experimental Station at Kanto-Tosan, they are tested for their field performance *vis-a-vis* the requirements as per agronomical recommendations. A special centre devoted to Farm Machinery thus would go a long way in promoting farm mechanisation in the right manner. In order to enable this centre to work effectively it should be assisted by an Advisory Board on which there should be nominated representatives of the State, agricultural scientists, industry and farmers. Considering the trend of mechanisation in agriculture now taking place, the need and usefulness of such a centre need no further stress. It will be most advantageous if the proposed Farm Machinery Testing Centre is located at or near one of the campuses of the University.

3.3.1.6 From the point of view of the farmer, once he is convinced of the use of farm machinery of different kinds, and of the use of fertilizers, pesticides, improved seeds, etc., he will begin to find that he stands in need, almost continuously, of assistance and guidance in one way or another in respect of one item of input or another. In order that such assistance should be available to him most easily and without having to waste too much of his time, it is suggested that farm assistance centres or depots (to use the expression, used by the Gujarat State Fertilizers Company whose depots supply, besides fertilizers, pesticides, seed testing facility and broad guidelines on agricultural practices) at which the farmer will be able to obtain guidance as to which input he needs for his purposes, assistance in servicing his farm machinery and also whatever guidance he requires in respect of any crop that he may have sown. To begin with, the Gujarat State Fertilizers Company may be requested to allow services it provides to be supplemented by other necessary services. Thus, for instance, the Agro-Industries Corporation could make available its qualified men to service farm machinery by setting up service centres together with requisite number of qualified personnel alongside GSFC depots. Such co-ordinated complex centres for service for affording requisite technical service to farmers should be set up alongside such of the existing GSFC depots as have the facilities existing for setting up a work-shop, etc. Efforts should, however, be made to see that even at the initial stage, the number of such centres is not less than fifty. The number should thereafter be increased in the light of the experience gained and as qualified technicians, agronomists, etc., become available, because it is considered most important that the farmer should have available to him at one place all the inputs and service ancillary to these inputs and that he should not have to travel more than a few miles to get assistance, guidance and service that he requires. The establishment of centres of this nature will not involve a great deal of financial investment by the Government but will certainly call for considerable organizational effort in the initial stage and readiness to provide financial assistance during the initial experimental period. It is certain that these centres will become self-supporting. Having regard, however, to the fact that there are a number of relatively backward areas agriculturally in the State, a certain amount of financial assistance will have to be provided over a longer period in those areas. Provision for this has been made in the outlays proposed for agricultural inputs during the Fifth and Sixth Plans.

3.3.1.7 The existing schemes for improved seeds, organic and farmyard manures a chemical fertilizers, plant protection, agricultural implements, development of commercial cro and intensive cultivation should be continued during the Fifth and Sixth Plans. Outlays (Rs. 17.00 crores and Rs. 33 00 crores are proposed during the Fifth and Sixth Plans on th schemes for agricultural inputs including the Farm Machinery Testing Centre as against the total outlay of Rs. 4.84 crores provided in the Fourth Plan.

3.3.2 Education and Research

3.3.2.1 Agricultural education has a crucial role to play in the State's agricultural production development effort. Agricultural educational system has to be expanded and modernized in keeping with the increasing demand for personnel with specialized knowledge in different disciplines. The State has already decided to set up an Agricultural University. The various research laboratories and agricultural educational institutions in the State will work as constituents of the University. In order to develop the right kind of persons with requisite qualifications and competence, the University should evolve purposeful and job oriented syllabi for different cadres of persons required to man specialised field vocations like pest control, seed production, farm management, etc., as well as those required to man jobs in research and developmental organizations. The University and its affiliates should embrace the entire field of agricultural education and research and its application to the agricultural fileds. Outlays of Rs. 10.00 crores and Rs. 20.00 crores are proposed for agricultural education in the Fifth and Sixth Plans respectively as against the Fourth Plan outlay of Rs. 1.76 crores.

3.3.2.2 The progress made in agriculture in recent past has indicated that investment in agricultural research pays handsome dividends in increasing the total income. The approved outlay on agricultural research is Rs. 347 lakhs in the Fourth Plan. This amount is principally used for research on major seed crops like cotton, groundnut, bajra, rice and wheat. Attention to research on fruits and vegetables, fodder crops, fruit preservation and other aspects is not of the same order. Since diversification of cropping pattern is essential, more attention should be paid to research on all these crops, hitherto regarded as of minor importance. The State investment in Agricultural Research is proposed to be increased to Rs. 7 crores and Rs. 15 crores respectively during the Fifth and Sixth Plan periods as against the outlay of Rs. 3.47 crores in the Fourth Plan.

3.3 2.3 In order to achieve balanced development in agriculture, co-ordinated research programmes should be undertaken. Gujarat State predominantly consists of population having vegetarian food habits and their main source of protein is pulses. Thus, to meet the full needs of proteins, higher production of pulses is very vital. All-out effort on priority basis should, therefore, be made to evolve early maturing and high yielding superior varieties in major legume crops such as tur, udid, gram and greengram both for irrigated and dry conditions.

3.3 2.4 It is to be expected that as the tempo of agricultural development gains momentum, more and more exacting demands of farmers will have to be met by the Agricultural Research Scientists of the State. In order to enable them to be ready with appropriate answers for the vast variety of problems which are likely to crop up, well-equipped regional agricultural research organizations should be established. Considering the agro-climatic conditions of the State, four Regional Agricultural Research Stations (viz., one in South Gujarat, one in Middle Gujarat, one in North Gujarat and one in Saurashtra) should be planned. Existing smaller research arms in various districts may be attached to the proposed Regional Research Stations as sub-lations. These regional research stations should work in close liaison with the State Agricultural niversities and must play a positive role in organizing proper agricultural extension activities ensure that the results of research quickly reach the farmers of the region concerned. These ional stations should undertake primarily field oriented research projects of direct benefit to ners and should also initiate special projects in the field of Agricultural Behavioural Sciences narily to evolve appropriate and effective extension methods and best suited approaches for rent farming communities having different economic and social habits in the regions. This d ensure wide scale adoption of the newly evolved technology as quickly as possible.

A proven and beneficial practice evolved through research has to quickly percolate to the farmers' fields if we are to reap rich dividends through research on a wide scale. The Department of Agriculture should be made responsible in collaboration with Panchayat institutions for speedy extension of the new findings of the research stations to the farmers' fields in the respective areas. Special financial provision should be made for extension work including publication of literature in simple language.

3.3.2.5 The establishment of a regional food technological laboratory is absolutely essential as it would provide the much needed direction for research efforts in addition to its other advantages. Sufficient facilities exist at Anand for the location of such a laboratory. The State Government should approach the Government of India for early action in this regard.

3.3.3 Extension Services and Farmers' Training

3.3.3.1 The new agricultural production techniques are not as simple as those of the past. For example, knowledge of pests and pesticides, soils and fertilizers, hybrid seed and its production, farm management and proper use of irrigation water, is essential if the extension workers have to render effective service to the cultivators. The present academic qualifications of extension workers do not make it possible to spread the new technology speedily. Besides having the knowledge of these subjects, the extension workers have to be familiar with methods and efficiency of various media of communications in rural areas. Therefore, the extension personnel to be provided for spread of the new technology should have higher academic qualifications. Qualitative strengthening of agricultural extension should, therefore, be an important policy for the future Plans.

3.3.3.2 The demands from the farmers seeking knowledge and information on improved methods of farming are bound to be progressively more exacting and pin-pointed and hence special refresher courses for the junior level extension workers should be organised more frequently to upto-date their knowledge. Short duration courses, primarily devoted to improved agricultural technology, should be planned at various agricultural research centres and at agricultural institutions and universities during the slack farming season of summer.

3.3.3.3 Agricultural education has to be taken to the grass root level in our village schools. Although many schools have a vocational training programme in agriculture, proper methodology in teaching and competent teachers having the knowledge of such methods are not available at present. Intensive agriculture will become more broad-based and wide-spread only when these young sons of the farmers are trained right from the primary and secondary educational level as is being done in the country schools of the U. S. A. The first pre-requisite for effective vocational training in agriculture is the development of teaching staff for this purpose. It is, therefore, necessary that our agricultural educational institutions and research institutions organise appropriate training programmes for such teachers during summer vacations. Special earmarked funds should be available for conducting specific programmes for vocational agricultural school teachers.

3.3.3.4 The strengthening of extension agency is particularly required for pest and disease control, seed production and soil and water management. The last is of greater significance as the quantity of water that is available and will be available will be always limited. Most efficient use of available waters has to be made. The need for proper levelling and grading of land and adequate drainage will arise. Special land development equipment and technical services will have to be provided in areas where irrigation is present or likely to be developed during the next five years. To look after the increased production and to service agriculture properly, roads and rural electrification will have to be improved. The knowledge of existing extension workers is extremely limited. This will have to be improved by providing higher level functioning with specialised knowledge of soil and water management.

3.3.3.5 Outlays of Rs. 2.30 crores and Rs. 5.00 crores are proposed for extension, training and farmers' education during the Fifth and Sixth Plans respectively as against the Fourth Plan outlay of Rs. 1.11 crores.

3.3.4 Agro-Industries

3.3.4.1 A sustained growth of agricultural production is largely dependant on development of adequate and efficient warehousing, marketing and processing facilities. Warehousing and marketing have been dealt with separately in para. 3.3.9 of this Chapter. Wherever feasible, processing of agricultural produce may be undertaken in the co-operative sector. It is desirable for the State Government to encourage the establishment of food processing plants by the Agro-Industries Corporation and the co-operative societies, though certain crops may require different treatment.

3.3.4.2 Groundnut, which is an essential commodity and the main oilseed and an important crop of Gujarat, has been a long standing problem in the State. This has been discussed in para 3.2.8.7 above.

3.3.4.3 If the co-operative societies are not able to handle processing of fruits and vegetables, a Board for Perishables should be set up in the public sector for processing fruits and vegetables.

3.3.4.4 The Gujarat Agro-Industires Corporation is planning the setting up of units like oil extraction plants, compost manure plants, rice/pulse mills, guar-gum processing, dehydration of fruits and vegetables, canning of fruits, agro service centres, etc. As it is proposed to develop soyabean as an additional source of the edible oil with targetted cultivation in 40,000 hectares in the Fifth Plan and in 80,000 hectares in the Sixth Plan, one soyabean processing plant will have to be set up in the Fifth Plan and another in the Sixth Plan.

3.3.4.5 Outlays of Rs. 12.10 crores and Rs. 22.00 crores in the Fifth and Sixth Plans respectively are proposed for Agro-Industries in the public sector.

3.3.5 Water conservation and use and management of water

3.3.5.1 Considering the low irrigation facilities obtaining in the State and only marginal possibilities of bringing additional land under the plough, larger agricultural production has to be realised only by striving hard to harvest high yields per hectare and by spreading the concept of multiple cropping through optimum use of the available irrigation water. This means that Gujarat must initiate a special programme aiming at utilization of every drop of water from irrigation projects and rain. The extravagant use of water now taking place in agriculture requires to be checked and efficient water managment practices need to be evolved. Excessive use of irrigation water creates problems of water logging and salinity. To realise the twin objectives of efficient water management and water conservation, massive compaigns to educate the farmers in efficient water management and water conservation require to be planned. Special research programmes to determine the optimum water requirements of different crops and water conservation techniques deserve special attention.

3.3.5.2 Besides conventional methods of irrigation, more economical, efficient and water saving new methods of irrigation such as sprinkler irrigation, polythene lining of channels, drip irrigation and other similar innovations on the lines of Israel should be developed to derive the maximum benefits of the massive investment made in irrigation projects. Stress should, however, continue to be laid on ayacut development. Only a beginning has been made in this field by setting up a regional soil and water management pilot project in Kakrapar command with Central Government's assistance. In Mahi Kadana command, farmers' training classes for use and management of water have been started at Thasra. Research in this field is also being carried out at the Regional Research Station in Navasri. However, all these efforts only constitute a beginning. To ensure that programmes of research on water management and water conservation receive due attention in the Fifth Plan, necessary provision is included under Agricultural Research and Ayacut Development. Outlays of Rs. 3.5 crores and Rs. 5 crores are proposed for Ayacut Development in the Fifth and Sixth Plans respectively against the Fourth Plan provision of Rs. 99 lakhs.

3.3.6 Dry Farming

3.3.6.1 The ultimate irrigation potential in the State being limited on account of the limited water resources of the State, agricultural growth mainly depends on improvement effected in rainfed crops. Soil and moisture conservation works have, therefore, a substantial role to play. It is necessary to devote considerable amount of effort in improving and evolving new dry farming methods including development of suitable varieties of seeds and agronomical practices. The regional agricultural research stations should devote special efforts to this important area.

3.3.6.2 When the arid zone research station was set up in Jodhpur, it was envisaged that one such station will be set up in Gujarat. One full-fledged arid zone research station should be set up early by approaching the Government of India.

3.3.6.3 Pilot projects in Dry Land Farming have been taken up in Rajkot and Amreli districts under a central sector programme. Dry farming projects should be taken up in all districts on the basis of experience gained in the pilot projects. Outlays of Rs. 5 crores and Rs. 8 crores are proposed in the Fifth and Sixth Plans respectively for dry farming projects.

3.3.7 Small and Marginal Farmers

3.3.7.1 The efforts on agricultural development will not serve the real socialistic goal of planned development unless the benefits of modern technology are made available to the small and marginal farmers, enabling them to put their small and marginal holdings to the most profitable use. Planned development so far has benefited the substantial landholders in a much larger measure than the small and marginal holders. Accordingly, pilot projects have been taken up recently, with central Government's assistance, in Sabarkantha, Surat and Junagadh districts for raising the potentially viable small farmers to viable status by extending all necessary assistance to enable them to make optimum use of their small holdings and achieve a viable status. Similarly, pilot projects have been taken up in selected talukas in Baroda and Bulsar districts for marginal farmers and agricultural labourers with the objects of raising them to a viable ecomomic status by enabling them,through extension of necessary assistance as well as engagement on rural works, etc., to put their marginal holdings to most profitable use and by improving their employment through occupational diversification.

3.3.7.2 It is of paramount importance that small and marginal holders and landless labourers are brought up, as speedily as possible, to the economic status of the rest of the rural population. The pilot projects under way should be continuously evaluated and concrete action programmes should be drawn up for the small and marginal farmers in the light of the results of the pilot projects. Lump sum outlays of Rs. 10 crores and Rs. 8 crores are proposed for such programmes during the Fifth and Sixth Plans respectively.

3.3.8 Organizational Set-up and Statistics

3.3.8.1 The agricultural organisational set-up should be reviewed from time to time in order to make it responsive to the needs of the time. It is necessary to have an adequately staffed and equipped statistical cell in the Directorate of Agriculture.

3.3.8.2 The Directorate of Agriculture is in charge of 'Statistics' relating to Agriculture and this function is attended to by the statistical wing of the Directorate which at present is headed by a Deputy Director. The principal activities relate to conduct and analysis of crop-cutting experiments to arrive at districtwise estimates of yields for different crops, compilation of area statistics, crop forecasts and preparation of season and crop reports and designing and conducting ad-hoc studies relating to agricultural production or land use. Data is also being compiled on rainfall, agricultural wages, farm harvest price, etc. In the coming years, the coverage of the crop cutting experiments will need to be extended to important minor crops in the State. The timeliness and accuracy of area statistics will also have to be improved. At present, the compilation and computations are done manually. The programme of development envisages introduction of mechanical tabulation system leading to use of electronic data processing, *i. e.*, computerization. For successful introduction of improved cultural practices,

and to work out variants to suit local agro-climatic conditions, detailed impact studies and ad-hoc surveys, more frequently than heretofore, will be necessary. All these activities will need upgrading and expansion of the statistical wing of the Directorate and investment in data processing machines.

3.3.8.3 A bench mark survey should be undertaken for dug wells, pump-sets and private tubewells and a cell should regularly maintain up-to-date data in this regard.

3.3.8.4 Outlays of Rs. 20 lakhs and Rs. 30 lakhs are proposed for agricultural statistics during the Fifth and Sixth Plans respectively.

3.3.9 Warehousing and Marketing

3.3.9.1 A Directorate of Agricultural Marketing should be set up, preferably before the commencement of the Fifth Plan. It should be adequately staffed and should have personnel with professional skills, on pay-scales comparable to those existing in the other organizations of heads of departments. This Directorate shall (*i*) supervise the regulated markets, (*ii*) anticipate problems relating to the marketing of agricultural produce, collect market intelligence, analyse data, disseminate information through concerned channels, (*iii*) undertake marketing survey and research, and (*iv*) give timely advice to Government on measures considered necessary to protect the interests of the producers.

3.3.9.2 The existing schemes of financial assistance to agricultural produce market committees for regulated markets, development of grading, construction of warehouses through the State Warehousing Corporation, etc., should be continued.

3.3.9.3 It is proposed to increase the storage capacity of the co-operative societies and warehousing centres from the estimated 2.30 lakh tonnes and 0.80 lakh tonnes at the end of the Fourth Plan to 3.05 lakh tonnes and 1.20 lakh tonnes respectively at the end of the Fifth Plan and 4.30 lakh tonnes and 1.80 lakh tonnes respectively at the end of the Sixth Plan. Provision for assistance to co-operative societies has been included in the outlays proposed for the co-operative sector.

3.3.9.4 Some one-tonne silos manufactured by Tatas are being tried by the Department of Agriculture at different places. Experience in this trial should form the basis of a concrete and realistic programme for encouraging storage in silos of different sizes at different levels, *i. e.*, farm, home, village society, etc.

3.3.9.5 Financial outlays of Rs. 200 lakhs and Rs. 400 lakhs are proposed in the Fifth and Sixth Plans respectively against the outlay of Rs. 100 lakhs in the Fourth Plan under this sector.

3.4 Summary of Outlays

A summary of the outlays on agricultural production programmes is given in the table below :—

TABLE

(Rs. in lakhs)

Sr. No.	Item	Fourth Plan	Fifth Plan	Sixth Plan
1	2	3	4	5
1	Agricultural Inputs	483.50	1,700.00	3,300.00
2	Education and Research	523.00	1,700.00	3,500.00
3	Extension and Farmers' training	111.00	230.00	600.00
4	Agro-Industries	25.00	1,210.00	2,200.00
5	Ayacut Development	99.00	350.00	800.00
6	Dry Farming	..	500.00	800.00
7	Small and Marginal Farmers	..	1,000.00	800.00
8	Agricultural Statistics	..	20.00	30.00
9	Warehousing and Marketing	100.00	200.00	400.00
10	Miscellaneous	8.50	20.00	40.00
		1,330.00	6,960.00	12,270.00

CHAPTER IV

SOIL CONSERVATION

4.1 On account of the extremely limited irrigation potential of the State, especially in the Saurashtra and Kutch area, and heavy soil erosion and loss of soil moisture due to heavy run-off of natural precipitation, measures for prevention of soil erosion and conservation of moisture assume crucial importance in Gujarat. Though detailed survey has not been made to determine the actual area needing protection from soil erosion, it is estimated that an area of about 40 lakh hectares needs soil conservation measures.

4.2 Objectives and Policies of the Fifth and Sixth Plans (1974-84)

4.2.1 It is roughly estimated that about 4 lakh hectares of land have been eroded by flood waters along the banks of rivers and ravines have been formed. The State Government had appointed a committee to study this question and, as recommended by the committee, had also appointed an advisory Board for Ravine Reclamation which had made certain recommendations at its last meeting held in January 1971. A centrally sponsored ravine reclamation pilot project is under implementation and a scheme for the afforestation and reclamation of ravine lands is also being implemented in the State Plan. But these efforts have been meagre as compared to the magnitude of the problem. The fertile nature of soil in these ravine lands and the possibility of irrigation facilities in these areas justify allocation of a very high priority to the reclamation of ravine lands. The following aims are, therefore, set up :—

(i) Reclamation of ravine lands should be taken up on a high priority basis. The fact that about 70 per cent of these lands are of private ownership should not delay the work of reclamation as the cost can be recovered wholly or partly from the beneficiaries under the law—an element of subsidy would be justifiable because early reclamation would lead to substantial increases in food production. Similarly, the policy for disposal of reclaimed lands belonging to Government can be decided as and when the lands are reclaimed and become available for disposal for cultivation. First things should come first, and the first thing is to reclaim the lands; the question of recovery of cost or of basis of allocation can be taken up much more satisfactorily and speedily at that stage.

(ii) A survey of all the ravine lands should be undertaken immediately and should be completed as a pre-Fifth Plan measure, so that a concrete and realistic reclamation programme can be chalked out for execution during the Fifth Plan.

(iii) Efforts should be made to complete the work of reclamation of ravine lands by the end of the Fifth Plan and, if any area is left over, it should be fully reclaimed during the Sixth Plan.

(iv) In order to ensure expeditious and efficient execution of ravine reclamation work, a Ravine Reclamation Board should be constituted and given adequate executive powers for speedy execution of the work of reclamation. The Board should be responsible for full development of these lands before handing over management to other parties. The process of reclamation can be said to have been completed only after three full agricultural seasons have passed and crops obtained. The first object of reclamation is to prevent further erosion of soil. Having prevented further erosion of soil, the Board should have adequate powers to put the reclaimed land to such use as it considers to be proper, including cultivation, afforestation, and the preservation of wild life. The possession of the reclaimed lands should be transferred to their owners and other parties only after they have been brought to a safe stage of development from all these points of view.

(v) Foreign assistance may be obtained in the form of equipment for expeditious implementation of the ravine reclamation scheme.

4.2.2 There are other areas, besides ravine lands, in need of soil and moisture co measures. The chronically drought affected areas need soil and moisture conservat on a priority basis as an anti-famine measure.

4.2.3 The Ghed area spreading over 518 sq. kms. in the delta of rivers Bhada Madhuvanti, Savli, etc., in south-west part of Junagadh has progressively suffered from logging, salt efflorescence and erosion. The Government had appointed a committee and a plan has been prepared as per the Committee's report. The Master Plan envisages an e of Rs. 217.60 lakhs which will benefit 38,853 hectares of land, which includes reclamatio 10,522 hectares and protection of 28,329 hectares by quick drainage. An expenditure of Rs. 6 lakhs has been incurred up to March, 1971 and an area of 16,593 hectares has been impro Taking into consideration the immediate benefits, the Government has decided to complete works as per the Master Plan as early as possible and it is expected that this work will be com pleted during the Fourth Plan. Similar works should be undertaken during the Fifth Plan on priority basis in the remaining Ghed area, known as 'Sorathi Ghed' in the south-east o Porbandar, which spreads over 906.5 sq. kms.

4.2.4 The reclamation of Khar lands also should receive priority. The Khar land problem is two-fold: the problem of salinity arising in the command areas of irrigation projects on account of lack of proper drainage and the problem of Khar lands in coastal areas. The reclamation of the latter type of lands is undertaken by the Khar Land Board. Experience of the work done so far has shown that adequate leaching is not possible unless irrigation water is available and so now the Board takes up reclamation of Khar lands only if adequate water for leaching is available. Moreover, reclaimed Khar lands require heavy investment if they are to be developed properly and put to profitable use. But the reclaimed Khar lands were in the past mostly given to the landless poor people who could not develop these lands, with the result that much of this land has again become unserviceable. As the development of reclaimed Khar lands requires heavy investment, it is suggested that such lands should be developed by the Khar Land Board itself. The Board should undertake this work in a business-like manner, making investments necessary for developing the reclaimed land as agricultural land, and running the developed land thereafter as Government farms For this purpose, the Board should be reconstituted so that it can effectively fulfil the new function proposed to be entrusted to it. Very competent and experienced persons should be placed on the Board and the chairman should be one known for his integrity, ability and experience.

4.2.5 The pilot project for drainage and reclamation of coastal area under Umbhrath, Danti-Bhatha Kharland will give experience in engineering aspects and soil behaviour and this experience would be utilised for enlarging the programme for drainage and reclamation of saline, alkaline, water logged and coastal areas.

4.3 Soil Conservation Schemes

4.3.1 The soil conservation schemes of (*i*) contour bunding, nala plugging, terracing, survey and maintenance, (*ii*) levelling of land, kyari making and construction of field channels in the command areas of irrigation projects, (*iii*) mechanical cultivation, (*iv*) strengthening of soil survey and soil conservation organisation, (*v*) training in soil conservation, (*vi*) soil conservation research, (*vii*) afforestation and reclamation of ravine lands, (*viii*) development of khar lands (*ix*) desert afforestation and soil and moisture conservation and afforestation of denuded areas, (*x*) development of ghed area, (*xi*) development of Bhadar area, and (*xii*) drainage and reclamation of saline, alkaline, water-logged and coastal areas should be continued and implemented during the Fifth and Sixth Plans.

4.3.2 Additional areas of 9.45 lakh hectares and 19.23 lakh hectares are proposed to be overed under contour bunding during the Fifth and Sixth Plan periods respectively. Thus, actically the entire area needing contour bunding can be covered by the end of the Sixth Plan

4.3.3 The survey of all lands needing soil conservation measures should be completed ing the Fifth Plan.

4.3.4 Financial outlays of Rs. 20 crores and Rs. 40 crores are proposed during the Fifth Sixth Plan periods respectively.

CHAPTER V
LAND DEVELOPMENT

(*Survey, Settlement and Consolidation of Holdings*)

5.1 The programme of land development in the Fourth Plan includes schemes of conso-idation of holdings, survey and classification in Kutch, resurvey or revision survey of lands n villages, reconstruction or rewriting of torn land records, and measurement of traverse Kharaba lands in Saurashtra districts. The Fourth Plan envisages an outlay of Rs. 100 akhs on all these schemes. The schemes of survey and classification in Kutch and measurement of traverse Kharaba lands in Saurashtra will be completely executed during the Fourth Plan eriod. The question of continuing the remaining schemes and taking up of new schemes ike village site survey and city survey during the Fifth and Sixth Plan periods (1974-84) needs onsideration.

5.2 The Government had appointed a committee to appraise the scheme of consolidation f holdings and final decision on the appraisal report of the committee is yet to be taken. y the end of the Fourth Plan the scheme will have been completed in some 2,112 villages out f 18,584 villages at a cost of about Rs. 176.56 lakhs. At this rate, it would take several decades o complete the work. Moreover, within its present scope the scheme is neither able to abolish he existing fragments nor to prevent further division of consolidated blocks. In these circum-tances and having regard to the large expense involved, there would appear to be a good case or discontinuing the scheme.

5.3 It is felt that Government will not find it expedient to introduce resettlement of land evenue on account of the multifarious problems which such a step would inevitably create. t is, therefore, necessary that expenditure on resurvey or revision survey is restricted to the arest minimum in order to ensure that survey records are correct and up-to-date. Moreover, would be more appropriate to take up this work as a non-Plan item of expenditure.

5.4 It is absolutely necessary that torn land records are reconstructed or rewritten. By s very nature, this is a continuous activity and should appropriately be taken up as a non-lan activity.

5.5 The schemes of village site survey and city survey are, by their very nature, self-paying chemes as the expenditure on such schemes is recovered from holders of properties by way of ees for *sanads* Such schemes may be taken up where feasible but they do not constitute evelopmental expenditure and should preferably be taken up as non-Plan schemes.

5.6 No Plan outlay on land development appears to be necessary in view of the fact that chemes under this sector should be taken up as non-Plan items of expenditure.

CHAPTER VI

ANIMAL HUSBANDRY AND DAIRY DEVELOPMENT

6.0 The planning perspective for the Fifth and Sixth Plan periods is laid out below in t parts: Part-I dealing with Milk Production and Dairy Development; Part II dealing w schemes of Animal Health and other Livestock Production.

PART I

MILK PRODUCTION AND DAIRY DEVELOPMENT

6.1 Introduction

6.1.1 The planners and administrators in the country, during the first three Five Year Plan periods, were preoccupied with programmes for maintaining the ever increasing human population in a state of base-level nutrition. The three Annual Plans from 1966 to 1969 carried these programmes through to their logical and natural culmination-near self-sufficiency in calorie foods through what is popularly known as the Green Revolution The Green Revolution, however, achieved only the limited objective of holding back hunger and starvation by increasing yields per hectare and total production of foodgrains But calorie foods by themselves provide only a low plane of nutrition, a bare subsistence diet, and the individual is still vulnerable to the hazards of malnutrition.

6.1 2 There is now increasing awareness of the ill-effects of protein deficiency on both the national progress and the full development of the human personality. The orientation of the Plan should, therefore, be towards improvement in the quality of foods and increases in the availability of quality food, especially animal proteins. Dairying and investments in dairy development are the practical solution to the problem of quality food production in the country.

6.1.3 Dairying, however, has many dimensions in a developing country like India, with a predominantly agricultural economy. Intensive agricultural programmes with increasing degree of mechanisation and the consequent increase in the per hectare and per capita grain production have already shown tendencies of reducing the employment potential in the agricultural sector resulting in an ever increasing shift of the unemployed rural population to our already congested cities. The 1971 provisional census estimates reflect this trend in the population shift accounting for an estimated 2 78 per cent increase in the percentage of urban population to total population. The total increase in the urban population has been of the order of 43.33 per cent during the last decade. Further, assessments in 1969-70 indicated that some 40 per cent of the rural population lived below the poverty line. Poverty examined in the national context is a problem of low national incomes and its inequitable distribution, of slow pace of development and the inequitable distribution of the small gains of development. National estimates anticipate doubling of the national income in 12 years from 1969 to 1981 and an increase in per capita consumer expenditure by 42 per cent. But if this gain continues to be monopolised by the upper and middle income groups, only negligible gains will be reflected in e incomes of the poor. This could make little impression on poverty. Therefore, the lution to poverty and rural unemployment centres around enterprises that can gainfully ploy vast number of persons with no means of production on their own and put them to ductive work so that they may contribute to the national product and earn their share in it. ying is one of the most likely rural enterprises that can provide tremendous potentials ainful and productive employment of the rural population. It can equitably distribute the nd permeate even the weakest sections of the society, considering that milk is one of the mmodities which gives the producer a larger share of what the consumer pays for ·

6.1.4 Dairying can act as an effective instrument for social change in rural India. Given the right type of organisational structure, the rural community can be knitted into corporate bodies which can effectively handle the production, procurement and marketing of milk and milk products. Their participation in the organisation's governing and administration will condition them to accept the elements of social discipline. The sanitation and cleanliness of their village milk procurement centre can effectively introduce them to the principles and practice of hygiene and health. Their involvement with livestock and their feeding would initiate in them an understanding of the fundamentals of food and nutrition. Economics of production and dairy farming can easily give them an insight into the problems of home economics. Thus the many dimensions of dairying, as an instrument for social change in rural communities, further justify the investments proposed in the Fifth and Sixth Plans and indicate a rapid transformation of the rural pockets into self-reliant economics, substantially contributing to the national product.

6.1.5 For the successful functioning of such economic enterprises in our villages, it is necessary that they are given a corporate identity. In most developed countries, co-operatives have emerged as the most cohesible farmer organisations. In Germany, some 90 per cent of all organised dairies are owned by the farmers' co-operatives and in U. K. the co-operatives successfully undertake all the milk procurement and cattle development programmes. In India on the other hand, many people take co-operatives with discernible scepticism, understandably, because in many parts of the country they have not produced the expected results. Compared to these, the co-operatives in Gujarat have been stunningly effective in bringing about a viable vertical integration of rural enterprises. The Kaira District Co-operative Milk Producers' Union in Anand, for example, has some 1.85 lakh producer members and it constitutes one of the largest business enterprises in the country. In fact, the co-operative structure ensures the maximum benefit to its members, and farmers' co-operatives are necessary for a programme of sustained dairy development.

6.1.6 Gujarat had always been leading in dairying and the pace of dairy development in the State has become increasingly rapid with the implementation of the programmes under Operation Flood. The systematic destruction of our high-yielding milch animals in the cities shattered much of our hope for a reasonably productive national milch herd. The Operation Flood aims at facilitating the preservation of our highly productive animals by rehabilitating them in our rural sheds and their proliferation in their natural ecology. (The project itself is too voluminous to be detailed here). The main thrust of the project, however, is improving our animal's productivity through scientific cattle development programmes and the national marketing of the milk thus produced. The Project has allocated some Rs. 9.44 crores to Gujarat.

6.1.7 From the State's point of view, livestock production and development consist of four major action fronts and their essential supportive actions :—

(i) Planing and administration of livestock production and development.

(ii) The enhancement of milk production and of supplies to dairy plants.

(iii) The management of dairy plants.

(iv) Other livestock production and development.

The supportive actions are (v) research and (vi) training and education in dairy development and animal production.

6.2 Current status of Dairying in Gujarat

6.2.1 Planning and Administration of Dairy Development

6.2.1.1 Gujarat's planning and administration of dairy development have been largely influenced by two accidents : nature has decreed that seasonal water shortage shall inhibit

dairy development in the peninsular Gujarat; in contrast, the Central and Southern Gujarat enjoy a climate more favourable to dairy development and by an accident of history Central South Gujarat also benefits from co-operatives whose spontaneously produced leadership has largely handled dairy development, while, in peninsular Gujarat, a regional dairy development officer has directed locally the implementation of dairy schemes and the operation of State owned dairy plants. However, during the first half of the Fourth Plan period, most of the Government owned dairy plants were handed over to co-operatives. In the administrative department at Ahmedabad, an extremely small group has over-seen these developments in dairying. The growing size of the task may be seen from the following summary of dairy development expenditure and achievements

Dairy Development Expenditure and Achievements

	Third Plan	Fourth Plan	Remarks
1. Plan Expenditure (Rs. in lakhs)	381	175 00	Excluding animal husbandry (Plan provision)
2. Operation Flood investments (Rs. in lakhs)	.	944.00	
3. Primary Milk Producers' Co-op. Societies ..	600	1649	(On 31st December 1970)
4. Co-operative Unions	6	9	
5 Dairy Plants	6	9	
6. Members of Milk Producers' Co-operative Societies.	..	2,85,443	(On 31st December 1970)

Implementation of the Operation Flood programmes, more or less, coincides with schemes and investments under the Fourth Plan. Nevertheless, there had been considerable selectivity in its areas of operation, the most favourable ecologies receiving the investments and inputs. These programmes operate in the districts of Kaira, Mehsana, Sabarkantha and Banaskantha The investment pattern under Operation Flood is given below:—

Investment Pattern under Operation Flood

	(Rs. in lakhs)
1. Milk Collection and Chilling	105.00
2. Feeder Balancing Dairies	350.00
3. Technical inputs for increased production	449.00
4. Animal Improvement	40 00
Total ..	944.00

6.2.1 2 Clearly, Gujarat's Dairy Development is undergoing rapid growth If the rate is to be maintained, the administrative machinery must be adjusted to meet the growing demand which will be made on it.

.2.2 Enhancement of Milk Production and Supply

6.2 2.1 Milk "production" consists of all the milk produced in Gujarat. The term upply", from the dairy development point of view, relates to the milk supplied to modern dairy nts in the organised sector.

6.2.2.2 Milk production is often expressed in terms of ounces per capita daily. The natio- nutrition target is 10 oz. (0 28 litres) per capita daily, but national production currently ages half this amount. Although firm data are lacking, it appears that Gujarat's umption in 1965-66 was more or less little higher than the national average of 5 oz.

(0.14 litres) per capita daily. Thus, on this side, Gujarat's dairy development has done well to keep up with population growth, but we must now leave this plateau and start our ascent towards the national target. The table below shows milk production and per capita availability.

TABLE

Milk production and per capita availability estimates

Year		No. of milch animals in lakhs	Daily average yield in litres per animal in milk	Total annual production in '000 tonnes	Average daily per capita availability in ml.
1965-66					
Cow	..	16.30	1.67	457	53
Buffalo	..	16.50	3.08	1,163	131
	Total	..	..	1,620	184
1969-70					
Cow	..	17.25	1.85	536	61
Buffalo	..	18.70	3.10	1,185	134
	Total	..	..	1,721	195

6.2.2.3. Milk supply to modern dairy plants has grown from 70,000 to 3,56,000 litres daily at the end of Third Five Year Plan, when most plants were running at an average of only 33 per cent of capacity. Milk pricing, the organisation of procurement, and gross production–all these factors contribute to the success of each plant's supply planning. Therefore, during the Fourth Five Year Plan, all these factors were reorganised where they inhibit supply to a modern dairy plant. Tables 1 and 2 show the latest position in respect of dairy plants.

TABLE 1

Feeder/Balancing Dairies 1970-71

Name	Installed Capacity	Average daily through-puts in litres	Percentage of utilisation of capacity
Anand	5,00,000	3,25,000	65
Mehsana	*1,50,000	1,55,000 (including liquid milk handling)	103
Rajkot	45,000	11,435	25
Junagadh	10,000	1,460	14

*This is inclusive of expansions till date.

TABLE 2

Utilisation of Dairy Plants

LiquidMilk Plants (1970-71)

Name	Installed capacity	Average daily through-puts in litres	Percentage of utilisation of capacity
Ahmedabad	1,50,000	1,45,000	97
Baroda	55,000	58,000	105
Surat	50,000	22,000	44
Jamnagar	6,000	1,227	21
Bhavnagar	10,000	2,355	23

6.2.3 Management of Dairy Plants

6.2.3.1 The dairy plants run by the Kaira District Co-operative Milk Producers' Union are often held as examples of model dairy plant management in India. Nonetheless, many of Gujarat's dairy plants, like most dairy plants in India, have suffered from the shortage of capable dairy managers and technicians. For State-owned plants, these difficulties have been *aggravated by poor pay and conditions of Government. Organisational changes were there*fore introduced, especially in State-owned dairies, which will enable Gujarat's dairy managers and technicians, who are known throughout India to be second to none, to operate at maximal effectiveness

6.2.3.2 So far, our dairy development has largely consisted of building new plants. During the Fourth Five Year Plan, the total capacity of our modern dairy plants was expected to rise to 8,30,000 litres of milk daily but has actually exceeded this target. The table below shows the installed capacity. We must now concentrate on obtaining full utilisation of this increased capacity and on expansions to handle the increasing volumes targetted in the Fifth and Sixth Plans.

TABLE

Total installed capacity

Total installed capacity on 31st December 1970	..	9.76 lakh litres/day
Expansions and additional capacity (Operation Flood Programmes.)		5.50 lakh litres/day
Total capacity by 1974	..	15.26 lakh litres/day

6.2.4 Research in Dairying and Dairy Development

6.2.4.1 Gujarat now has several institutions capable of rersearch in dairying and dairy development. These are the Dairy Science College and the Veterinary and Animal Husbandry College at Anand, and the College of Agriculture at Junagadh and Navsari.

6.2.4.2 The Institute of Agriculture, Anand, has for a long time been known for its valuable work in breeding and especially for its Kankrej herd. Also, it has carried out useful work in genetics and animal feeding. During 1969-70, the institute established a pure bred Jersey farm as a nucleus herd to raise superior sires for the cross breeding programmes envisaged in the Fifth and Sixth plans.

6.2.4.3 Gujarat is fortunate in having such institutions at which the State's dedicated researchers in dairying can work It is necessary that the Fourth Plan period is used to improve communication between our researchers and the dairymen who work in the field, thereby maximising the application of research results to problems of milk production. During the Fifth Plan and afterwards it is hoped to spearhead the programmes for milk production through cross breeding and using the institute as the brain centre.

6.2.5 Training and Education in Dairying

6.2.5.1 At the start of Third Five Year Plan, the Dairy Science College at Anand graduated its first batch of students complete the two year course for the Indian Dairying Diploma. Till the end of 1970-71, 129 students have obtained their diploma from the institution. The four year course for B.Sc in Dairy Technology was started in 1961 and by the end of 1970-71, 105 students have graduated from this college. Each year, twenty-five candidates are admitted for the diploma course and twenty for the B. Sc. course For their practical work, dairy students at Anand are able to gain experience in the plants of Anand Dairy (Kaira District Co-operative Milk Producers' Union).

6.2.5.2 Thus, the State is better equipped than many others to produce dairy technicians. During the Fourth Plan, these gains will be consolidated and communications improved between the Dairy Science College and the technicians, managers and administrators who are responsible for Gujarat's dairy industry and dairy development.

6.3 Objectives and Policies for the Fifth and Sixth Year Plans for Gujarat's Dairy Development

6.3.1 An analysis of the current status of dairy development in Gujarat indicates the existence of a progressive and viable co-operative sector, which can rapidly transform the ideas and programmes conceived in the Fourth Plan into reality. The Fourth Plan allocations for dairy development in the State and Operation Flood investments and inputs in four districts of Kaira, Mehsana, Sabarkantha, and Banaskantha together will provide extra resources for the development of dairying. The combined effect of these programmes and investments in the Fourth Plan and Opertion Flood will facilitiate the State to achieve targets in dairy development far in excess of what is envisaged under the Fourth Plan. Therefore, the objectives of the Fifth and Sixth Plans have necessarily to start off from a higher plane of achievement.

6.3.2 Objectives in Dairy Development

6.3.2.1 The objectives for the Fifth and Sixth Plan periods are given below :—

(1) To increase consumption to 200 ml. per capita daily by the end of the Fifth Plan and to 240 ml. by the end of the Sixth Plan, assuming consumption rate of 175 ml. per capita per day by the end of the Fourth Plan.

(2) To achieve economic viability in all Gujarat's dairy plants by increasing the through-puts to at least 66 per cent of the expanded capacity by the end of the Fifth Plan and to increase the through-puts to 75 per cent by the end of the Sixth Plan.

(3) To increase the volumes handled by the organised sector of the industry to 20 lakh litres per day by the end of the Fifth Plan and to 30 lakh litres by the end of the Sixth Plan.

(4) To channel the production, procurement, processing and marketing of milk and milk products, through producers' co-operative unions, to use the co-operative unions as the vehicle for all investments and technical input for milk production enhancement programmes.

6.3.2.2 These objectives are reasonable and can be explained as follows :—

(1) Milk production enhancement programmes are necessarily slow maturing with longer incubation periods. Investments in the Fourth Plan and the Operation Flood programme would start-showing their impact on production by the second half of the Fifth Plan period. The contemplated increase in consumption rate is roughly 14 per cent by the end of the Fifth Plan. The population increase would necessitate another 11.5 per cent increase. So the total increase required would be 25.5 per cent of the Fourth Plan level of 175 ml. per capita per day. During the Sixth Plan the increase required would be 29.5 per cent over the Fifth Plan level of which 9.5 per cent is to take care of increase in population. This is not a very conservative target and the programmes for production improvement are designed to overtake the population increase.

(2) The Fourth Plan programmes are geared to increase the outputs of the existing plants to 66 per cent of their capacity. During the Fourth Plan there will be an increase of 6 lakh litres/day in the installed capacity. The Fifth Plan programmes anticipate these expanded installed capacities being utilised at the optimum level of 66 per cent. The investments on production enhancement during the Fourth and Fifth Plans are designed to reduce the seasonal swings in milk production, the main thrust of these programmes being on cross breeding of the cattle population. Therefore, during the Sixth Plan there will be

a progressive narrowing of the gap between lean and flush supplies, leading to the plants receiving increasing proportions of supplies during summer Thus the average throughputs of the dairies can be increased by another 9 per cent to 75 per cent of the installed capacities.

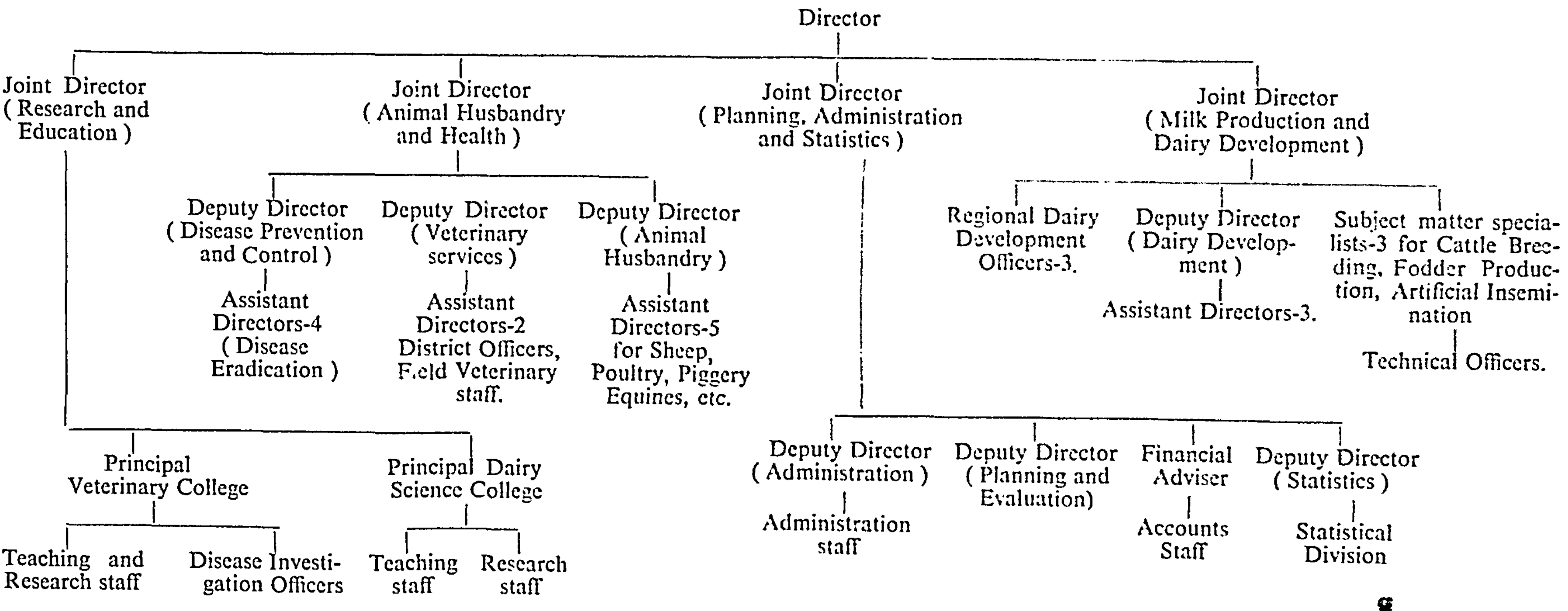
(3) By the end of the Fourth Plan the Third Plan figures of handling would have been more than doubled. The expanded capacities during the Fourth and Fifth Plan would possibly reach a handling of roughly 20 lakh litres per day. The inputs for production enhancement programmes including massive cross breeding schemes would ensure supplies of milk to further expand the processing capacities to 30 lakh litres per day.

(4) Inputs for production enhancement, both macro-level and farm level, can effectively reach the farmer producer only through producers' own co-operative organisations. This fact has been borne out by the development and progress of the District Co-operative Unions at Kaira, Mehsana, Surat and Baroda, in marked contrast to the erst while Government owned dairy plants and input programmes. This objective is, therefore, a necessary precondition to optimising investments on production enhancement.

6.3.3 Policies in Dairy Development

6.3.3.1 The State's machinery for administering dairy development be strengthened in order to cope with the enlargement of planned activities; to the extent possible, the department will concentrate on guiding and co-ordinating development, on helping procurement and processing organisations to help themselves, rather than getting directly involved in the extensive field operations required to achieve our targets in particular, on providing up-to-date information on progress made in dairying, and on circulating continuing analysis of comparative results achieved by the organisations responsible for production, procurement processing, and marketing in each district, so that lessons learned in one place may be rapidly applied elsewhere. The Department of Animal Husbandry will, therefore, be reorganised as the Directorate of Livestock Production and Marketing and restructured as outlined in the organisational chart on page 40. The pay scales for veterinary services shall be revised in an imaginative way to attract good talent to veterinary services. A livestock census is being conducted quinquennially and the Institute of Agricultural Research Statistics has been organising surveys on yield aspects of livestock production Some ad-hoc studies have also been conducted but available statistics in this important sector of economy are very limited Looking to the potential of development of this sector and the programme of development envisaged over the next decade, it is necessary that an adequate system of periodic data collection and compilation is worked out and put into operation covering various aspects of production, distribution, consumption and trade of livestock products. It will also be necessary to work out yield estimates of various heads of livestock and poultry and the impact thereon of introduction of exotic strains and of improved feed and maintenance characteristics. It is, therefore, considered necessary, in the perspective of development, to provide for creation of a full-fledged wing for development of livestock statistics headed by a Deputy Director (Statistics) under the Joint Director (Planning, Administration and Statistics) in the Directorate of Livestock Production and Marketing. Provision for this has been made in the proposed outlay on reorganisation of the department.

Organisation chart for the Directorate of Livestock Production and Marketing



1. Director : 1800—100—2000
2. Joint Director : 1400—60—1640—80—1800
3. Principals :
   Deputy Directors :
   Regional Dairy Development Officers
   Subject matter specialists
   Financial Adviser
   } 1300—60—1600
4. Professors, Disease Investigation Officers } 850—50—1000—EB—55—1275
5. District Officers, Assistant Directors, Technical Officers. } 500—30—650—EB—35—825—EB—45—1050—50—1100.

6.3.3.2 Top priority will be given to increasing milk production. In particular, artificia insemination will be used to lower average calving periods, and provision will be made for anticipated increases in requirements of feed and fodder. In the Saurashtra area, special emphasis will be placed on not increasing the milch cattle population, on removal of uneconomic cattle, and on ameliorating summer green fodder shortages. A large scale sterilization of uneconomic cattle will be undertaken. The main thrust of the production enhancement programme during the Fifth and Sixth Plans will be on cross breeding of the cattle population in Gujarat. The herds of improved cattle in the Saurashtra area will be settled near the grass godowns of the Forest Department, if drinking water for cattle can be made available there. The State, operating through the co-operative unions and other ad-hoc corporate bodies, will make the necessary technical inputs available in suitable areas to launch a massive cross-breeding programme. Nearly 60 per cent of the total milk produced in the State comes from the buffaloes. Therefore, programmes and investments to sustain and improve the buffaloes in the State will be continued.

6.3.3.3 The investments and inputs for production enhancement programmes will be channelled through producers' co-operative unions, which will also handle procurement. To the extent that these organisations achieve their procurement targets, the State will reimburse them up to 50 per cent of their expenditure on production enhancement. The intensive cattle development projects will be operated and implemented by the co-operative unions functioning in their respective areas. Urban milk supply will be organised through consumer co-operatives, which will obtain their supply of milk through the producers' union. The consumer co-operatives will not be engaged in procurement of milk as this is the primary responsibility of the producers' own unions. The *gopalak sanghs* will confine their activities to the rehabilitation and resettlement of the *maldharis* and other nomadic cattle keepers in the State. Such organisations, however, will not be engaged in milk procurement and marketing. There will be a uniform pattern of bye-laws and administrative set-up for milk unions/co-operatives, and registration shall be given only if the proposed union/society agrees to adopt such uniform pattern.

6.3.3.4 When autonomous unions are established as suppliers to plants and therefore as bargaining agents for producers whose milk is sold to dairy plants which are not co-operatively owned, then movement of milk products out of such unions' areas of operation will come under licence control.

6.3.3.5 Inputs for cross breeding and artificial insemination will be handled by n autonomous body representing the interests of the producers' unions and the overnment.

6.3.3.6 Long term programmes of cattle selection and breeding will be undertaken as cial programmes. Responsibilities for such programmes will be shared, as may be appro- e, by the State's institutions of research, by Government, and if the need and opportunity by foreign aid organisations.

3.3.7 Policy in para 6.3.3.3. above will apply also to a special programme, if it proves , for extensive improvement of uncultivated land for use as pasture in the Saurashtra tch regions. A study should be undertaken to evolve a programme for improvement itable use of these lands.

8 Special emphasis will be placed, particularly in Saurashtra area, on reducing er shortages during the summer. The agricultural research institutions in the State on research on a sufficient scale in order to advise on the species of dry and irrigated h could be most profitably grown in different dry and irrigated areas of the State. e of expansion of existing cattle feed factories/setting up new cattle feed factories up to meet the growing requirement of cattle feed. As green fodder cultivation severe competition from cereal and commercial crops, ensuring higher profits on evolution of high yielding varieties, production of green fodder should be linked n a package extension service to be organised by milk unions. Arran

in Kaira district by the Kaira District Milk Producers' Co-operative Union can serve as a model for the supply of cattle feed supplemented by green fodder and hay.

6.3.3.9 Approaches to price setting will be designed with a view to encouraging production. Movement of milk from one dairy plant (or chilling centre) to a purchasing dairy plant will be on a market basis. In view of the cross breeding programmes, the pricing policy of milk will be based on the two axis pricing system. The fat and non-fat solids will be valued on the basis of what the consumers pay for them. Therefore, the proportion of valuation will be some 66 per cent of the value of fat for non-fat solids. Acceptance of the two axis pricing policy will be a condition for assistance to co-opertive unions and dairy plants.

6.3.3.10 Each dairy plant manager will conduct his plant's operations autonomously and will have authority over pricing. Joint marketing of milk products, if any, will be undertaken on a normal commercial basis. Each manager's over-riding policy will be to achieve economic viability for his plant preferably within three years of start-up.

6.3.3.11 When decisions are required on construction of new dairy plants, three major criteria will prevail :

(a) Is there sufficient local leadership and potential milk supply to make the plant successful ?

(b) Are the necessary managers and technicians available to design, construct and run the proposed plant ? and

(c) What shall be the minimum economic size of the plant ?

This policy is intended to permit the managers and technicians who are available to concentrate chiefly on obtaining economic viability for the plants already built. No new plants will be installed with capacities less than 50,000 litres per day, as the present day techno-economics indicate this to be the minimum for breakeven and viability.

6.3.3.12 To cope with the increasing demands for skilled technicians in the dairy industry, a suitable training centre will be set up in the State. This centre will eventually be able to train all the different types of skilled technicians for the dairy industry in the country.

6.3.3.13 All programme of research will be entrusted to the research institutions and universities in the State. The funds available for approved programme of research will be placed at the dispossal of these insitutions. The department will act only as the controlling and guiding force.

6.3.4 Projections and Calculations used in writing the Plans

6.3.4.1 The Perspective Plan calculations are, out of necessity, based on available secondary data even though such data are scarce and very often of questionable origin. But, since it is necessary to quantify the inputs and investments designed to achieve the proposed targets, the available data are used with caution, and of course, supported by rough estimates in many instances.

6.3.4.2 The Plan's targets are to increase the per capita consumption of milk and the handling of the organised sector of the dairy industry in the State. Programmes for increased production have, therefore, to overtake the population increases. The State's human population would reach 2.93 crores by the end of the Fourth Plan. This can normally be expected to increase to 3.31 crores and further to 3.61 crores by the end of the Fifth and Sixth Plans respectively. The through-puts of the installed dairy plants in the State would be some 20 lakh litres per day at the end of the Fifth Plan, and 30 lakh litres per day at the end of the Sixth Plan. The through-puts of the liquid milk plants in the State would be entirely for the consumption of State's population and some 30 per cent of the through-puts of the feeder balancing plants

and the product plants would also be consumed in the State either as liquid milk or as products. Therefore, the production targets can be estimated as follows :—

Fifth Plan

Requirement to meet a per capita consumption of 200 ml. per day for 3.31 crores population ..	.. 66.20	lakh litres per day
70 per cent of the through-puts of the product plants	. 10.55	lakh litres per day.
Total ..	76.75	lakh litres per day.
or some ..	2.8	million tonnes annually.

Sixth Plan

Requirement to meet per capita consumption of 240 ml. per day for 3.61 crores population	86.64	lakh litres per day.
70 per cent of the through-puts of the product plants	15.08	lakh litres per day.
Total ..	101.72	lakh litres per day.
or some ..	3 7	million tonnes annually.

The Fourth Plan investments and the operation flood inputs and investments together are expected to push up the State's milk production to some 2.17 million tonnes annually by 1974. Therefore, the proposed increases in production during the Fifth and Sixth Plans would reflect an absolute increase of 29 per cent and 71 per cent respectively from the Fourth Plan end production level. The increases in production during the Sixth Plan, some 71 per cent of the Fourth Plan level or some 32.5 per cent of the Fifth Plan level, though apparently ambitious, would however be realisable, because the inputs on the cross breeding programmes would start paying off during the Sixth Plan period.

6.3.4.3 By the end of the Fourth Five Year Plan, the State will have some 1.8 million breedable buffaloes and an equal number (1.8 million) breedable cows. During the Fifth Plan, some 0.99 million cows and some 0 92 million buffaloes will be covered by the various input schemes. The remaining 0.81 million cows and 0.88 million buffaloes would be receiving only veterinary care and disease control programmes. But during the Sixth Plan, the coverage for technical inputs will be increased to some 1 6 million cows and 1.2 million buffaloes, leaving only a small number of poorer than average cows and buffaloes. The programme of coverage of these milch animals under the two Plans can be summarised as below :—

(Total cows & buffaloes in millions)

Scheme	Fifth Plan		Sixth Plan	
	Cows	Buffaloes	Cows	Buffaloes
1	2	3	4	5
Schemes in para 6 4.5.1 and 6.4 5.2	7 × 200 × 200 = 0.280	..	7 × 200 × 300 = 0 42	..
Schemes in para 6.4.5.3. and 6 4.5 8.	5 × 1.00 lakh = 0 50	2 × 1 00 lakh +3 × 0.03 lakh = 0 29	9 × 1.0 lakh = 0 9	4 × 1 0 lakh + 4 × 0.30 lakh = 0.52
Schemes in para 6 4.5.4.	4 × 0.30 lakh = 0 12	4 × 1 0 lakh = 0 4	4 × 0 30 lakh = 0 12	4 × 1 0 lakh = 0 4
Schemes in para 6 4 5 6	0 025	0.020	0.05	0.04
Operation Flood Scheme	0 067	0 21	0 067	0.21
Total ..	0.992	0 920	1.57	1.17

in Kaira district by the Kaira District Milk Producers' Co-operative Union can serve as a model for the supply of cattle feed supplemented by green fodder and hay.

6.3.3.9 Approaches to price setting will be designed with a view to encouraging production. Movement of milk from one dairy plant (or chilling centre) to a purchasing dairy plant will be on a market basis. In view of the cross breeding programmes, the pricing policy of milk will be based on the two axis pricing system. The fat and non-fat solids will be valued on the basis of what the consumers pay for them. Therefore, the proportion of valuation will be some 66 per cent of the value of fat for non-fat solids. Acceptance of the two axis pricing policy will be a condition for assistance to co-opertive unions and dairy plants.

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6.3.3.11 When decisions are required on construction of new dairy plants, three major criteria will prevail :

(a) Is there sufficient local leadership and potential milk supply to make the plant successful ?

(b) Are the necessary managers and technicians available to design, construct and run the proposed plant ? and

(c) What shall be the minimum economic size of the plant ?

This policy is intended to permit the managers and technicians who are available to concentrate chiefly on obtaining economic viability for the plants already built. No new plants will be installed with capacities less than 50,000 litres per day, as the present day techno-economics indicate this to be the minimum for breakeven and viability.

6.3.3.12 To cope with the increasing demands for skilled technicians in the dairy industry, a suitable training centre will be set up in the State. This centre will eventually be able to train all the different types of skilled technicians for the dairy industry in the country.

6.3.3.13 All programme of research will be entrusted to the research institutions and universities in the State. The funds available for approved programme of research will be placed at the dispossal of these insitutions. The department will act only as the controlling and guiding force.

6.3.4 Projections and Calculations used in writing the Plans

6.3.4.1 The Perspective Plan calculations are, out of necessity, based on available secondary data even though such data are scarce and very often of questionable origin. But, since it is necessary to quantify the inputs and investments designed to achieve the proposed targets, the available data are used with caution, and of course, supported by rough estimates in many instances.

6.3.4.2 The Plan's targets are to increase the per capita consumption of milk and the handling of the organised sector of the dairy industry in the State. Programmes for increased production have, therefore, to overtake the population increases. The State's human population would reach 2.93 crores by the end of the Fourth Plan. This can normally be expected to increase to 3.31 crores and further to 3.61 crores by the end of the Fifth and Sixth Plans respectively. The through-puts of the installed dairy plants in the State would be some 20 lakh litres per day at the end of the Fifth Plan, and 30 lakh litres per day at the end of the Sixth Plan. The through-puts of the liquid milk plants in the State would be entirely for the consumption of State's population and some 30 per cent of the through-puts of the feeder balancing plants

and the product plants would also be consumed in the State either as liquid milk or as products Therefore, the production targets can be estimated as follows :—

Fifth Plan

Requirement to meet a per capita consumption of 200 ml. per day for 3.31 crores population	66.20	lakh litres per day
70 per cent of the through-puts of the product plants ..	10.55	lakh litres per day.
Total ..	76.75	lakh litres per day.
or some ..	2.8	million tonnes annually.

Sixth Plan

Requirement to meet per capita consumption of 240 ml. per day for 3.61 crores population	86.64	lakh litres per day.
70 per cent of the through-puts of the product plants	15.08	lakh litres per day.
Total ..	101.72	lakh litres per day.
or some .	3.7	million tonnes annually.

The Fourth Plan investments and the operation flood inputs and investments together are expected to push up the State's milk production to some 2.17 million tonnes annually by 1974. Therefore, the proposed increases in production during the Fifth and Sixth Plans would reflect an absolute increase of 29 per cent and 71 per cent respectively from the Fourth Plan end production level. The increases in production during the Sixth Plan, some 71 per cent of the Fourth Plan level or some 32.5 per cent of the Fifth Plan level, though apparently ambitious, would however be realisable, because the inputs on the cross breeding programmes would start paying off during the Sixth Plan period.

6.3.4.3 By the end of the Fourth Five Year Plan, the State will have some 1.8 million breedable buffaloes and an equal number (1 8 million) breedable cows. During the Fifth Plan, some 0.99 million cows and some 0 92 million buffaloes will be covered by the various input schemes The remaining 0 81 million cows and 0.88 million buffaloes would be receiving only veterinary care and disease control programmes. But during the Sixth Plan, the coverage for technical inputs will be increased to some 1.6 million cows and 1.2 million buffaloes, leaving only a small number of poorer than average cows and buffaloes. The programme of coverage of these milch animals under the two Plans can be summarised as below :—

(Total cows & buffaloes in millions)

Scheme	Fifth Plan		Sixth Plan	
	Cows	Buffaloes	Cows	Buffaloes
1	2	3	4	5
Schemes in para 6 4.5.1 and 6 4 5.2	7 × 200 × 200 = 0.280	..	7 × 200 × 300 = 0.42	..
Schemes in para 6.4 5.3 and 6 4.5.8.	5 × 1 00 lakh = 0 50	2 × 1 00 lakh +3 × 0 03 lakh = 0 29	9 × 1.0 lakh = 0.9	4 × 1 0 lakh + 4 × 0.30 lakh = 0.52
Schemes in para 6 4.5 4.	4 × 0 30 lakh = 0 12	4 × 1 0 lakh = 0 4	4 × 0 30 lakh = 0 12	4 × 1 0 lakh = 0.4
Schemes in para 6.4 5 6	0.025	0.020	0.05	0 01
Operation Flood Scheme	0 067	0 21	0.067	0.21
Total ..	0 992	0 920	1.57	1.17

The Plan schemes, as already stated, are designed to cover the above mentioned milch animal populations. During each of the Plan periods, coverage of the targetted milch animal populations will start with 50 per cent in the first year, going on to 75 per cent in the second year and reaching 100 per cent in third year of the Plan.

6.3.4.4 The performance of the milch herd during the pre-Plan period and the expected improvement in their production traits are summarised below :—

Plan Period	Milch animal	Per cent in milk during the year	No. of days in milk	Daily yield for animal in milk	Total lactation yield
1	2	3	4	5	6
				Litres	Litres
Fourth Plan	Local cows ..	46	200	2.9	580
Fifth Plan	"	51	200	3.4	680
Sixth Plan	"	51	200	3.4	680
Fourth Plan	Buffaloes ..	56	300	3.4	1020
Fifth Plan	"	62	300	4.1	1230
Sixth Plan	"	62	300	4.1	1230
Performance of cross-bred cows ..		65	300	6.0	1800

6.3.4.5 The total milk production, during the different Plan periods, is dependent on the above projections. The different technical inputs marketed during the two Plan periods would thus account for an increase of some 20 per cent in the daily average yield per milking animal and some 10 per cent in the number of animals performing each year, obviously due to shortening of the inter-calving period. The production estimates are summarised below :—

Fifth Plan

The 0.81 million cows, which are not covered by the input schemes, would annually be producing some 0.28 million tonnes of milk. Similarly, the buffaloes falling outside the purview of the input schemes would account for some 0.67 million tonnes of milk annually. The milch cows and buffaloes, which received the benefit of the package of inputs would be contributing some 0.34 million tonnes and 0.70 million tonnes annually. By the end of the Fifth Plan, roughly 0.42 million heads of cross-bred cows will already be performing, adding some 0.76 million tonnes of milk. The total annual production of milk by the end of the Fifth Plan would therefore be some 2.8 million tonnes.

Sixth Plan

By the end of the Sixth Plan, some 1.56 million breedable cows out of the 1.80 million milch cows in the State, would have come under the plan coverage for technical inputs and animal improvement. Intensive cross-breeding programmes would by then have created a population of some 2.0 million cross-bred cows, which could effectively replace the less productive parental generations. Therefore, 1.30 million (i. e. 65 per cent of 2.0 million) cross-bred cows performing each year would produce annually some 2.34 million tonnes of milk. The 1.17 million buffaloes covered by the schemes would provide an annual production of roughly 0.89 million tonnes of milk. Another 0.48 million tonnes of milk will be accounted for, as the production of the buffaloes which are not covered by the input schemes, bringing the total annual milk production to 3.7 million tonnes, by the end of the Sixth Plan.

6.3.4.6 The four cattle feed plants in the State have a total capacity to produce 550 tonnes of balanced cattle feed per day. But the total quantity produced is less than 350 tonnes per day. The production enhancement programmes contemplated under the Fifth and Sixth Plans would warrant the supply of some 1.1 million tonnes and 1.7 million tonnes of concentrates per year, respectively. Naturally not all of this can be balanced concentrates. However, some 30 per cent of the total concentrate requirement is planned to be supplied as balanced feed. To achieve this end, the installed capacities of the existing plants will be doubled during the Fifth Plan and two more plants will be set up under the Sixth Plan.

6.3.4.7 The total availability of the dry and green fodder crops and the estimated requ- ments of each is given in the table below. These figures are, however, very crude estimates present the gross availability and requirements for the entire cattle and buffalo population the State. As against a total requirement of 15 8 million tonnes of dry fodder per year, so 18.2 million tonnes are already available. Therefore, no dearth of dry fodder is anticipated duri the plan periods.

TABLE

Availability of hay and kadab from crops

	'00 Hectares		Yield per hectare (tonnes)	Tonnes
	1		2	3
Dry :				
1. Rice straw	5074	×	1.578	8,00,677
2. Wheat straw	5538	×	2.534	14,03,329
3. Jowar kadab	13427	×	1.746	23,44,354
4. Bajari Kadab	18670	×	3.300	55,72,050
5. Maize kadab	2676	×	3.501	9,36,867
6. Millet straw	2049	×	1.386	2,83,980
7. Pulses	5293	×	0 363	1,92,135
8. Groundnut	19420	×	2.178	42,29,676
9. Jowar (fodder)	469	×	2.5	1,17,250
10. Grass and Babuls	3908	×	5	19,54,000
11. Field vetch	2686	×	1 3	3,75,180
			Dry Total	1,82,09,498
Green :				
Lucerne	244	×	50	12,20,000
Guinea grass	72	×	45	3,24,000
Hot weather Jowar	139	×	25	3,47,500
Field hedge lines	98017	×	0.25	24,50,425
			Total ..	43,41,925
Green :				
Permanent pastures	10106	×	2	20,21,200
Net forest	16259	×	2	32,53,8[illegible]
Cultivable waste	5080	×	2	10,16,0[illegible]
			Total	[illegible]
			Green Total ..	[illegible]

Requirement of Dry and Green Fodder for the Bovine population :

Cattle ;	Male	..	3101385 × 5.806 =	18006641	Green
			3101385 × 1.825 =	5660027	Dry
	Female	..	1779749 × 4.977 =	8857810	Green
			1779749 × 1.825 =	3248041	Dry
	Young	..	1662817 × 4.147 =	6895702	Green
			1662817 × 0.829 =	1378475	Dry
Buffaloes :	Male	..	34,998 × 5.806 =	203198	Green
			34998 × 1.825 =	1174982	Dry
	Female	..	1819811 × 5.806 =	10565822	Green
			1819811 × 1.825 =	3321155	Dry
	Young	..	1285581 × 4.147 =	5331304	Green
			1285581 × 0.829 =	1065746	Dry

Total requirement for the Bovines :

Green	..	498.60 lakh tonnes
Dry	..	158.48 lakh tonnes.

The requirement of green fodder can, however, be, theoretically estimated for the target population of milch animals. The daily average requirement of the green fodder would be roughly 20 kgs. per animal covered. Therefore the estimated requirements at the end of the Fifth Plan would be some 18.60 million tonnes per year, and the Sixth Plan requirement would be roughly 23.60 million tonnes. The Plan proposals, however, are designed to enhance the fodder production in their areas of operation, providing specific inputs for the same. It is estimated that some 2.19 lakh hectares should come under fodder crops during the Fifth Plan and that the area should be increased to 3.44 lakh hectares under the Sixth Plan. This is for cultivating both leguminous as well as grass crops, predominantly perennial in the case of grasses and seasonal in the case of legumes. By the end of the Fourth Plan, already some 1.01 lakh hectares will be under leguminous and grass crops. The production from existing pasture lands and the forests will continue to be available for the rest of the animal population in the State.

6.3.5 Pre-Plan actions

The Fifth and Sixth Five Year Plans are designed to take the State of Gujarat to near self-sufficiency in milk and other animal products. The Plan proposals and budget help to quantify the magnitude of the task. The implementation of these programmes has necessarily to be based on further detailed planning for the several individual schemes, only a summary of which appears in the Plan document. Therefore, the following pre-Plan actions are proposed to ensure the organisation, manpower, and resources for the Plan start-up :—

(1) The Department of Animal Husbandry should, during the remaining part of the Fourth Plan, be reorganised into the proposed "Directorate of Livestock Production and Marketing." The organisational chart provided in the Plan document reflects the staff structure required for the implementation of the Plan.

(2) The emoluments (salaries and allowances) of the different categories of staff in the new Directorate of Livestock Production and Marketing should desirably be revised to the scales of pay proposed in the Plan document. It would be obvious that the present slabs of emoluments would not attract the much needed superior talents to the profession, but will eventually lead to the saturation of the different disciplines of animal production with average or less than average talents.

(3) The innumerable Plan schemes proposed would be extremely difficult, if the statistical wing of the department is not geared to shoulder the responsibility right from the beginning of the Fifth Plan. So it is proposed to devote special attention to this aspect during the pre-Plan years.

(4) The Government should examine the policy statements made in the Plan document and should arrange for the legislation, enactment, or enforement of already enacted rules and laws, wherever necessary, during the pre-Plan period.

(5) The new department should then, along with the detailed programming of the individual Plan schemes, draw up an inventory of the equipments, not available within the country, and should arrange for their phased imports, so that the implementation of the Plan schemes will not face any bottlenecks.

(6) The key-village schemes, as they are implemented under the previous Plans, do not figure in the future Plans. All the existing key-villages should, therefore, be merged with the intensive milk production enhancement schemes, wherever they overlap the areas of such schemes. In other areas, they should be handed over to the "Registered Society of Breeders" to be organised under the Fifth Plan.

(7) The department should start the initial organisational efforts to form an autonomous body of the breeders in the State This body should be operational at the beginning of the Fifth Plan, so that it can handle the vast inputs contemplated in the Plans.

(8) The intensive cattle development projects, now administered directly by the Department of Animal Husbandry, should be handed over to the producers' unions in the respective areas, wherever they exist and are capable of handling such input schemes. Alternatively, such projects should be entrusted to the breeders' society, as soon as it is operational.

(9) The intensive milk production enhancement projects, proposed in the Perspective Plans are designed to be administered by producers' co-operative unions. Therefore, in the areas of the proposed schemes, the department should strengthen the co-operative unions wherever they exist and organise such co-operative unions during the pre-Plan period, in areas where the infrastructure does not exist.

(10) Past experience has proved beyond doubt that artificial insemination schemes, oriented around middle level skills like the stockmen, are ineffective. The Perspective Plans, therefore, propose such schemes through village primary co-operatives or village level units of the breeders' society, but utilising the village youth, in all cases. No proposals for training fresh stockmen are, therefore, included in the Fifth and Sixth Plans, but refresher and in-service training for the already existing incumbents are taken care of.

(11) The planned increases in production necessarily invite adequate emphasis on manpower development to man the various Plan schemes. The basic skills up to the graduate level are to be developed by the teaching and research institutions in the State. Therefore, the Plan provisions quite appropriately propose strengthening and expansion of such institutions. However, higher skills at post-graduate level and expertise in advances in the practice of the various professional fields would be necessary for the effective implementation of the Plan. Therefore, the department should, during the pre-Plan period, train an adequate number of senior and junior officers in such fields at the outstanding institutions both within the country and abroad.

6.4 Schemes in the Fifth and Sixth Plans

6.4.1 Expansion of Milk Plants and Increasing the Through-puts

6.4.1.1 The Fourth Plan and Operation Flood inputs will together increase the installed capacities of the dairy plants in Gujarat to some 15.26 lakh litres a day. By the end of the Fifth Plan the procurement volumes will increase to 20 lakh litres per day and this will further increase to 30 lakh litres per day by the end of the Sixth Plan. These estimates are based on the impact of all the production enhancement programmes, with massive inputs in cross breeding of the local cows. Proportionate to the development potential of each area, the expansions of the dairy plants, through the Co-operative Unions who own them, are proposed during the Fifth and Sixth Plans.

6.4.1.2 The dairy plants in Kaira and Mehsana will receive only token provisions during the Fifth Plan, as they have already reached a manageable capacity through inputs under Operation Flood. These plants, however, might need further expansion during the Sixth Plan period.

6.4.1.3 The Sabarkantha and Banaskantha plants, though set up under Operation Flood, can profitably expand during the Fifth Plan with scope for further expansion during the Sixth Plan.

6.4.1.4 The dairies in the Saurashtra region, *viz.*, Junagadh, Rajkot, Bhavnagar and Jamnagar, would need considerable expansion during the Fifth and Sixth Plans in view of the massive cross-breeding programmes proposed in these areas.

6.4.1.5 The scheme proposes a new dairy plant at Bhuj in the Kutch area during the Fifth Plan and expansion of that plant under the Sixth Plan.

6.4.1.6 The dairies at Surat and Baroda are essentially market milk plants and expansion of their capacities will include the bulk vending systems in Baroda and Surat, for increasing their share of the milk market.

6.4.1.7 The Ahmedabad Dairy, though owned by the Municipal Corporation, is considered under the Plan for expansion of the capacity. This is to take care of possible necessity in providing a grant either to the Corporation or any other agency owing it in future. The provisions for the Ahmedabad Dairy, however, include the bulk vending systems for milk distribution.

6.4.1.8 The physical targets and financial outlays on this scheme are summarised in the table below :—

TABLE

	Fifth Plan		Sixth Plan	
	Physical	Financial	Physical	Financial
	Litres/day	(Rs. in lakhs)	Litres/day	(Rs. in lakhs)
1. Junagadh	20,000	10.00	30,000	20.00
2. Rajkot Feeder/Balancing dairy	75,000	25.00	1,00,000	50.00
3. Bhavnagar Feeder dairy	30,000	15.00	50,000	40.00
4. Jamnagar Feeder dairy	10,000	10.00	25,000	20.00
5. Surat Dairy	75,000	40.00	1,00,000	40.00
6. Baroda Dairy	1,25,000	40.00	1,50,000	40.00
7. Kaira (Anand) Fourth Plan target is 8,00,000 Litres/day from Operation Flood investments. So token provision during Fifth Plan and provision for expansion during the Sixth Plan. ..	..	20.00	10,00,000	400.00
8. Ahmedabad Dairy	20,000	75.00	2,50,000	100.00
9. Mehsana Dairy Fourth Plan target is 3,00,000 Litres/day from Operation Flood investments. So token provision for Fifth Plan and provision for expansion in the Sixth Plan	..	20.00	5,00,000	400.00
10. Sabarkantha Dairy Fourth Plan target through Operation Flood investment is 75,000 Litres/day.	1,00,000	25.00	2,00,000	200.00
11. Banaskantha Dairy Fourth Plan target through Operation Flood investements is 75,000 Litres/day ..	1,00,000	25.00	2,00,000	200.00
12. Kutch (Bhuj) Dairy	20,000	40.00	50,000	60.00

6.4.2 Urban Milk Distribution System through Consumer Co-operatives

6.4.2.1 Consistent with the policies of the State for dairy development, urban supply schemes will be organised, increasingly, through consumer co-operative socie This scheme proposes to organise such distribution system in the following urban areas in State during the Fifth Plan :—

1. Gandhinagar.
2. Nadiad.
3. Broach.
4. Cambay.
5. Anand.

By the end of the Sixth Plan the number of the urban areas covered by the scheme will be raised to 15, more or less covering the milk distribution in all the major urban areas of the State with population above 50,000. The major dairies handling city milk distribution would, of course, continue to supply milk to the consumers directly.

6.4.2.2 The system of distribution would be based on automatic bulk vending machines, operating throughout the day milk distribution. Under the consumer co-operatives in each urban area, 10 such bulk vending systems will be established. Supply of milk to the vending booths will be through the district milk producers' union of the area.

6.4.2.3 The physical targets and financial outlays on this scheme are shown below :—

Plan	Physical (No. of urban areas)	Financial (Rs. in lakhs)
Fifth Plan	5	100.00
Sixth Plan	10	150.00

6.4.3 Federation of Co-operative Milk Unions

6.4.3.1 The State of Gujarat has been in the forefront in dairy development work. However, there are lots of different agencies taking up this type of work, such as co-operatives, Government, Municipalities, private industry, etc. In order to develop the dairy industry on sounder lines, a federation is proposed of all the district unions and co-operative dairies, as soon as they feel it in their interest to form a federation. The federation will facilitate collaboration on the movement of milk and milk products, policies for purchase and sale of milk, training and education, as well as demarcation of areas for procurement operations.

6.4 3.2 It is anticipated that this voluntary body will greatly assist Gujarat's dairy evelopment, and that the concerned organisations will wish to organise it early in the Fifth Plan riod. To help them do this, Rs. 100.00 lakhs have been provided for office equipment, sonnel induction, and for purchase of road and rail tankers, and initial processing/conserva- facilities. Provision is also made to enable the federation to take over inefficient dairies. ng the Sixth Plan, the provisions of Rs. 500 lakhs is made for setting up large scale cing and conservation facilities.

Dairy Education and Research

ry Science College, Anand

1 The college was started in 1961-62 with a programme to impart dairy at two levels: the Indian Dairy Diploma Course and the B. Sc. (dairy degree). The college at present trains each year 25 students for the 2 year IDD

course and 20 students for the 4½ year B. Sc. (Dairy) course. The college has only a limited staff strength even for the existing programmes of education and the plant and laboratory facilities need considerable expansion. During the Fifth and Sixth Plan periods, this scheme proposes to increase the strength of students per batch, for each course as follows :—

I.D.D. Course	..	25 students
B. Sc. (Dairy) Course	..	40 students

In addition, Post-Graduate training facilities will be introduced, enabling the college to train ten students each year for M. Sc. (Dairy) Course. The physical targets and financial outlays during the Plan periods are summarised below :—

Plan	Targets	Capital and non-recurring (Rs. in lakhs)	Recurring (Rs. in lakhs)
Fifth	25 IDD students 40 B. Sc. (D. S.) 10 M. Sc. (D. S.)	45.00	37.50
Sixth	25 IDD students 40 B. Sc. (D. S.) 15 M. Sc. (D. S.)	50.00	50.00

(*Note*.—The capital and non-recurring expenditure includes a Rs. 10 lakh revolving fund, during the Fifth Plan period, for operating the students, dairy and workshop).

Technicians Training Centre

6.4.4.2 The growing need for adequately skilled technicians in the different trades to man the modern dairies in the State and in the country as a whole is being felt increasingly by the State administration. Therefore the State, in collaboration with the National Dairy Development Board and the producers' co-operatives in the State, will set up a Technicians Training Centre at Mehsana. The centre will ensure continued supply of the required number of technicians for the dairy plants in the State. The financial outlays and physical targets are indicated below :—

Plan	Financial (Rs. in lakhs)	Number of trainees
Fifth	25.00	100
Sixth	50.00	150

6.4.5 Milk Production Enhancement Programmes

Organisation of Autonomous Registered Society of Breeders

6.4.5.1 The main thrust of the production enhancement programmes in the Fifth and Sixth Plans is cross breeding of the local cattle with exotic dairy breeds. In order to handle the inputs for such a massive programme of cross breeding, it is proposed to set up a corporate body in the form of a registered society of breeders. This body would than be equipped and financed to the extent proposed for covering 7 districts of the State during the Fifth Plan period. The districts covered by the breeders' society will be those which are not

covered by the intensive cattle development programmes or intensive milk production enhancement programmes. The breeders' society will handle the following action items :—

(a) Setting up bull studs and semen banks.
(b) Organisation of the network of A. I. Centres at village level.
(c) Administering the A. I. programmes and evaluating the results.
(d) Establish nucleus herds of exotic cattle for raising future bulls.
(e) Handle and utilise imported frozen semen from proven bulls.
(f) Organise herd registration and milk recording in areas covered by it.
(g) Generate funds for the functioning of the society by the sale of warm or frozen semen, charging A. I. in villages and by rendering consultancy services on payment of technical fees.
(h) Establish cross-bred farms for supplying cross-bred bulls for future *inter-se* matings.

The society will function as an autonomous body which generates funds for the furtherance of its objectives and for the actual execution of its programmes. All services rendered by it will be charged. The breeders' society will be self-supporting by the end of the Fifth Plan, except for investments for the expansion programme. Therefore, during the Sixth Plan period, funds for the expansion programmes are included in Plan proposals. Thereafter the body will be completely autonomous. The summary of expenditure during the Fifth and Sixth Plan periods is given in table below :—

TABLE

	(Rs. in lakhs)
Fifth Plan Period	
Share capital (State contribution)	1.50
Headquarters establishment and buildings ..	2.50
Revolving fund for operations	10.00
Managerial subsidy	2.50
Nucleus farm for exotic cattle	20.00
Total ..	36.50
Sixth Plan Period	
Expansion of the nucleus farm	20.00
Expansion of organisational network	20.00
Total ..	40.00

The breeders' body will be organised as an autonomous registered society, administered by a paid secretary who will be the chief executive, and assisted by a complement of technical and administrative staff. The society will function under a board of directors and a chairman.

Artificial Insemination Schemes with Semen Banks and Stud Farms

6.4.5.2. The autonomous breeders' society will own and operate the artificial insemination programmes in districts which are not covered by the intensive milk production enhancement programmes. This scheme proposes the setting up of 7 such schemes during the Fifth Plan, perating with warm semen. During the Sixth Plan, all of them will switch over to frozen semen nd will increase their scope and coverage. Two of the seven artificial insemination centres ll be equipped with LN 2 deep freeze units and a larger number of exotic bulls—40 bulls for ch of the two centres. Each of these seven units, owned and operated by the breeders' ociation, will establish a stud farm with 15 exotic bulls and a central semen bank. They be supplying semen to 200 village level artificial insemination centres organised under the ervision of the officer-in-charge of the semen bank. The village artificial insemination res will be manned by reasonably educated and trained villagers.

The table below indicates the expenditure for one unit and the total plan outlays and physical targets.

TABLE

Summary of expenditure during the Plan periods for one unit

Fifth Plan

Item	(Rs. in lakhs)
Central semen bank with stud farm with 15 bulls including buildings, land and equipment.	5.00
Revolving fund for operations	2.00
200 village artificial insemination centres	3.00
Total	10.00

Sixth Plan

Item	(Rs. in lakhs)
Deep freeze unit at the central semen bank	7.00
Additional land, machinery, etc.	1.00
Expansion of buildings, expansion of stud farm to 40 exotic bulls	2.50
Equipping the existing 200 village centres with frozen semen equipment.	11.50
Expanding the coverage of the scheme by increasing the number of village centres by 100 to 300 centres.	6.00
Total	28.00

Total Plan Proposal

Plan	Item	Physical targets (No.)	Financial targets (Rs. in lakhs)
Fifth	Central semen banks	7	70.00
	Exotic bulls	105	
	Village A. I. centres	1,400	
Sixth	Deep freeze units at central semen banks	2	150.00
	Exotic bulls	150	
	Village A. I. centres with deep frozen semen	2,100	

The breeders' society will charge for artificial insemination at the rate of Rs. 3 per service. The scheme will be able to generate sufficient funds for its continuation and would, therefore, be not receiving any recurring expenditure from the State.

Intensive Milk Production Enhancement Programme

6.4.5.3 Improvement of cattle and intensification of milk production in Gujarat has been limited by the wide dispersal of milk production throughout the State. The spatial distribution of milk production pockets and the logistics of procurement, therefore, to a large extent, hampered the development of marketing the rurally produced milk. During the Fourth Plan period intensive cattle development programmes mainly to provide concentrated inputs were organised mostly in the milk sheds of the promising production areas. However, except in two instances—Kaira and Mehsana, where the projects were handled by the Producers' Co-operative Unions, the inputs were through Government agencies. Even the quantum of inputs provided was inadequate for intensive production enhancement programmes.

This scheme, therefore, proposes massive production enhancement programmes in selected progressive dairy milk sheds, through producers' own organisations. Wherever the producers' organisations–District Milk Producers' Co-operative Unions–are not adequately developed, the scheme will temporarily be handled either by the Department of Livestock Production and Marketing or preferably by the newly formed autonomous body–the registered society of the breeders.

The scheme proposes to provide the framers' organisation all the investments both at the union level and at the village co-operative level. The running costs at the union level will be shared by the Government to the extent of 50 per cent of the total annual costs, for the first five years. Thereafter the union should generate the funds for the continuity of the inputs on a " per litre of milk procured " basis The running costs for the village level unit-primary co-operative society of milk producers–will be fully met from Government funds for the first two years. Thereafter the annual expenditure should be borne by the village level union on a per litre of milk procured basis.

The scheme will provide the package of inputs to the producers, identifying the needs and quantifying the inputs in each case. Generally the inputs will include —

(*a*) Veterinary care through the mobile veterinary clinics.
(*b*) Preventive veterinary care and disease control through the village level units by organising vaccination and innoculation campaigns, annually.
(*c*) Artificial insemination jointly by the Headquarters A. I. Centre and the village level units. There will be no intermediary agencies like stockmen.
(*d*) Fodder development and production.
(*e*) Animal husbandry extension.
(*f*) Veterinary first aid through village level units.
(*g*) Enforcement of Livestock Improvement Act–mass castration of scrub bulls.

Each scheme will operate with 500 village level units–primary' milk producers' co-operative societies.

Headquarters staff		Average monthly salary
		Rs.
Project Administrator	1	1,600.00
Subject matter specialists :		
Veterinary	1	1,400 00
Breeding	1	
Statistics	1	
Fodder production	1	
Co-operative and Extension	1	
Veterinary Surgeons	40	900 00
Agronomists	6	900.00
Veterinary Assistants..	3	400 00
A. I. Assistants	3	400.00

Village level units

Part-time employment of village co-operative society assistant secretary for A. I. and first aid.	1 for each village unit	Average monthly allowance of Rs. 60.

Scheme Investments

Union Headquarters level	Rs. in lakhs
Administrative block	1.50
Veterinary station	4.00
A. I. centre and Stud farm	5.00
Staff and labour quarters	17.50
Total ..	28.00

This includes investments on buildings, instruments, livestock and 4 vehicles for field use. The mobile veterinary clinic will be operated using hired vehicles.

Running Costs

Annual running costs .. .. Rs. 30.60 lakhs

Village Level Units

Investments on A. I. equipment, veterinary first aid kit, service crate, etc. .. .. Rs. 3,000.00

Annual running cost including allowance to society employees for A. I. and first-aid and replacement of medicines and equipment. .. .. Rs. 3,000.00

The physical targets and financial outlays on the scheme are summarised below :—

Physical Targets

Headquarters A. I. centre	1
Headquarters veterinary station	1
Mobile veterinary clinics	25
Emergency veterinary units	10
Village level first-aid A. I. units	500

Financial Outlays (Rs. in lakhs)

	Capital and non-recurring	Recurring	
Headquarters organisation ..	28.50	@ 50 per cent of total annual expenses for 5 years.	76.50
Village level organisation ..	15.00	Full grant for first 2 years.	30.00
	43.50		106.50

· Total financial commitment for one project for the entire Plan period : Rs. 150.00 lakhs.

During the Fifth Five Year Plan 5 such projects will be set up at a total cost of Rs. 750 00 lakhs :

Banaskantha district	..	..	..	1
Sabarkantha district..	..	..	..	1
Rajkot district	..	..	..	1
Bhavnagar district	..	..	..	1
Junagadh district	..	..	..	1

During the Sixth Plan, four more such projects will be launched, based on the development of infrastructure in other areas, from the combine dimpact of the Fourth and Fifth Plans.

A summary of the total Plan expenditure on this scheme is given in the table below:—

TABLE

Summary of Plan expenditure

(Rs. in lakhs

Plan	No. of Projects	1st year		2nd year		3rd year		4th year		5th year	
		Capital and non-recurring	Recurring	Capital and non-recurring	Recurring	Capital and non-recurring	Recurring	Capital and non-recurring	Recurring	Capital and non-recurring	Recurring
Fifth	5	277.50	151.50	..	151 50	..	76 50	.	76 50	.	76 50
Sixth	4	174 00	121.20	.	121.20	..	61.20	.	61.20		61 20

Intensive Cattle Development Schemes

6 4 5 4 The existing intensive cattle development projects would need further intensification of the inputs and investments. Out of the four projects implemented during the Plan periods two are operated by milk producers' unions and two are directly implemented by the department. For the continuance of these schemes and for the required additional inputs, this scheme proposes to provide the adequate funds, as shown below :—

Plan		No. of ICDPS	Financial outlay for additional inputs and investments (Rs. in lakhs.)
Fifth	..	4	276.00
Sixth	..	4	247.00

State Farms for Gir and Kankrej Cattle

6.4.5.5 This scheme proposes to preserve pure lines of the existing breeds of cattl in Gujarat, Kankrej and Gir. The objective of the scheme is to establish one State farm fo each of the two breeds. The State Government already has 5 State farms, but all of them ar equally inadequately equipped and developed. The attempt here is to invest for expandin and developing two of the existing State farms into modern cattle farms with adequate resourc for forage crop cultivation. These farms will raise pure breed Gir and Kankrej bulls for use cross breeding programmes in case backcrosses become inevitable in future. They will also

supplying bulls to areas which are not covered by the cross breeding programmes. The expenditure in each farm and the total targets and outlays are given in the table below :—

TABLE

Plan expenditure for each farm

(Rs. in lakhs)

Plan		Yearwise 1st	2nd	3rd	4th	5th	Total
Fifth	Capital and Non-recurring Investments ..	9.50	3.00	1.00	..	..	13.50
	Recurring ..	5.26	5.26	5.26	5.26	5.26	26.30
	Total ..	14.76	8.26	6.26	5.26	5.26	39.80
Sixth	Capital and Non-recurring Investments ..	5.00	1.75	..	..	..	6.75
	Recurring ..	6.80	6.80	6.80	6.80	6.80	34.00
	Total ..	11.80	8.55	6.80	6.80	6.80	40.75

Plan targets — Physical and financial

Plan	Physical: Farms	Bulls raised for supply	Financial (Rs. in lakhs)
Fifth	2 State farms	150	79.60
Sixth	Expansion of 2 State farms	300	81.50

Integrated Area Development Programmes

6.4.5.6 This scheme proposes to exploit the potentialities of the arid zones in Kutch area for milk production. Development of this area, however, is a question of the total ecology and would, therefore, necessitate investments in many areas of development. This scheme, therefore, forms a part of the integrated scheme of the various Government Departments like the Department of Agriculture, Department of Forests, Department of Animal Husbandry, Department of Irrigation and the Public Works Department. The allocations given below under the two Plan periods are designed to take care of the investment need in specific milk production inputs, provided provisions and plans from the other departments mentioned above are deployed first to change the total functional utility of the area as a whole. These milk production inputs more or less follow the investment pattern of intensive milk production enhancement programmes, with a heavier emphasis on grass land and forage crop development. The Plan outlays are shown below :—

Plan	Financial outlay (Rs. in lakhs)
Fifth	180.00
Sixth	85.00

This project will be taken up in collaboration with the U. N. D. P. Programmes.

Other Cattle Development Schemes

6.4.5.7 Over and above the major schemes of milk production enhancement, it is proposed to continue the minor schemes listed below, during the Fifth and Sixth Plan periods The physical and financial targets of the different component schemes are summarised in the table below :—

TABLE

Component Scheme	Fifth Plan		Sixth Plan	
	Physical	Financial Rs in lakhs	Physical	Financial Rs. in lakhs
1. Subsidy to cattle breeding institutions	7 Institutions.	9 00	7 Institutions.	4 50
2. Purchase of bulls from co operative societies.	250 Bulls	3.00	250 Bulls	3 00
3. Enforcement of Livestock Improvement Act	State level	13.75	State level	10 50
4 Establishment of bull depots ..	100 Nos.	20 00	60 Nos.	15 00
5 Central herd registration scheme ..	50 MR cattles 5,000 cows	8.29	50 MR cattles 5,000 cows	11 50
6 Schemes for cattle development in Dangs.	..	15.50	..	10.00
7 Gaushala development programme	..	23.07	..	12.00
8 Minor schemes for fodder development.	.	17 00	.	12 00
9 Scheme for marketing research and intelligence for livestock and livestock products.	.	2.00	..	2 50
10. Expansion of the existing exhibition unit and setting up an information unit.	.	5 00	.	7 00
Total .	..	116 67	.	91 00

Cattle Feed Plants

6.4.5 8 The State has at present four cattle feed plants with a total installed capacity to handle 550 tonnes of balanced cattle feed per day. The plants at Anand, Mehsana and Surat are owned by the milk producers' unions in the respective areas. The plant at Rajkot is owned by the Gujarat State Agro-Industries Corporation. During the Fifth Plan it is proposed to double the capacity of the plants at Surat, Rajkot and Mehsana at a total cost of Rs. 30 00 lakhs.

The increased demand during the Fifth and Sixth Plans will necessitate the establishment of two more plants, each with a capacity to produce 200 tonnes of the balanced feed per day Therefore, a provision of Rs. 120.00 lakhs is included under the Sixth Plan.

6.4.6 Administration, Directorate of Livestock Production and Marketing

6.4 6 1 Programmes of livestock production and marketing are currently being supervised by an extremely small group of officers in the Department of Animal Husbandry at Ahmedabad With expansion of the existing programmes and taking of additional new schemes, it is [illegible] to reorganise and restructure the existing Department of Animal Husbandry. Th[illegible] proposes to organise a new department, i. e., the " Directorate of Livestock Prod

Marketing" and merging the present Animal Husbandry Department as a unit in the proposed department. This new Department will be on par with the State Department of Agriculture. The organisational chart of the proposed "Directorate of Livestock Production and Marketing" is furnished on page 40. The total financial requirement for this reorganisation will be Rs. 55 lakhs during the Fifth Plan and Rs. 70 lakhs during the Sixth Plan.

6.4.6.2 The Department will function as a controlling and evaluating agency rather than as an agency deploying the different technical inputs and instruments. The detailed implementation of the different Plan programmes will, wherever possible, be handled by the Farmers' Organisations, Autonomous Registered Society of Breeders and other corporate Bodies. The Department's new structure will equip it with a statistical division, which will effectively monitor and evaluate the operations under the Plan schemes.

6.4.6.3 Along with the reorganisation of the Department, this scheme proposes a revision of salary scales of the different categories of staff. This is necessary to attract the best talents to the profession and should naturally start with the veterinary graduates and graduates of other branches of animal sciences. The following scales of pay are proposed :—

Post	Scale
Director	Rs. 1800—100—2000.
Joint Directors	Rs. 1400—60—1640—80—1800.
Principals Deputy Directors Regional Dairy Development Officers. Subject matter Specialists. Financial Adviser	Rs. 1300—60—1600.
Professors Disease Investigation Officers	Rs. 850—50—1000—EB—55—1275.
District Officers Assistant Directors Technical Officers	Rs. 500—30—650—EB—35—825—EB—45—1050—50—1100.
Veterinary Graduates Agriculture Graduates Dairy Science Graduates	Rs. 375—25—750—50—800.

PART II

SCHEMES OF ANIMAL HEALTH AND OTHER LIVESTOCK PRODUCTION IN FIFTH AND SIXTH PLANS

6.4.7 Animal Health and Disease Control

Veterinary Services and Disease Control

6.4.7.1 This scheme primarily aims at modernising the Department's veterinary hospitals and dispensaries and increasing their numbers to cover new areas which are not covered by the milk production enhancement programmes. The provision for the purchase and supply of veterinary medicines and modern instruments and equipments so far had been rather negligible. During the Fifth and Sixth Plan periods a systematic effort will be made to modernise the already existing veterinary institutions and for their continuance till the end of the Sixth Plan.

e scheme will also endeavour to launch programmes for eradication of the prevalent epide-
cs and will organise mass vaccination and inoculation programmes.

The physical and financial targets for the two plan periods are given in the table below :—

TABLE

Action Item	Fifth Plan		Sixth Plan	
	Physical target	Financial target (Rs. in lakhs)	Physical target	Financial target (Rs. in lakhs)
1	2	3	4	5
1. Modernisation of veterinary institutions including supply of equipments and medicines	..	25 00		35 00
2. New veterinary institutions including investments on medicines and equipment	25	20 00	30	35 00
3. Mobile veterinary units .. .	10	5 00	20	12 00
4. Disease eradication and control programmes	..	50 00		68.00
Total .	..	100 00	.	160 00

Veterinary Education and Research

6.4.7.2 This scheme provides for the programmes of expansion and research in the Gujarat Veterinary College at Anand. In addition to the undergraduate courses the college will be equipped for post-graduate training in different subjects Provisions for the required expansions are made in the Fifth and Sixth Plan proposals The disease investigation programmes for cattle, sheep, poultry and other species will be organised under the supervision of the principal of the college.

The college will also design inservice and refresher training programmes for the technical staff of the Department. These would include programmes on —

(*a*) Internship for undergraduates.

(*b*) Inservice training for livestock instructors.

(*c*) Advanced training programmes in veterinary science and animal husbandry.

(*d*) Training in sheep husbandry.

(*e*) Farmers' training programmes.

(*f*) Refresher training programmes for departmental officers.

A biological product unit will be set up under the supervision of the principal of the college. This is to give the required preventive veterinary care and to support the massive cross breeding programmes launched during the two Plan periods. The college will be provided with an extension wing to train undergraduate and post-graduate students

practice of animal husbandry extension. The extension wing will also operate a modern ambulatory clinic. The Plan outlays for the above scheme are summarised below :—

Action Items	Fifth Plan Financial outlay (Rs. in lakhs)	Sixth Plan Financial outlay (Rs. in lakhs)
Expansion of the veterinary college	25.00	30.00
Biological product unit	25.00	30.00
Disease investigation units	9.00	18.00
Post-graduate training programme	6.00	15.00
Short training programme and refresher course ..	28.00	32.00
Internship programme	1.00	1.50
Extension wing and ambulatory clinic ..	6.00	10.00
Establishment of cattle and poultry farms for training the students.	..	13.50
	100.00	150.00

Carcase Utilisation and Disposal—Modern Slaughter Houses

6.4.7.3 The existing slaughter houses in the State are mostly make-shift arrangements, privately operated, and are far too inadequate for the present day requirements. This scheme aims at setting up an experimental modern slaughter house in Ahmedabad municipal area during the Fifth Plan period. Depending upon the increased demand for wholesome meat, two more such slaughter houses will be set up during the Sixth Plan. In addition to the processing and supply of wholesome meat, these institutions will also be able to process and conserve the inedible portions of the carcase which invariably has fairly high demand in the industrial sector. Therefore, the allocations shown below are provided during the two Plans.—

Plan	No. of slaughter houses	Financial outlay (Rs. in lakhs)
Fifth	1	35.00
Sixth	2	50.00

6.4.8 Sheep Development

Cross-breeding with Exotic Rams

6.4.8.1 The Government of Gujarat has accepted cross-breeding of local *patanwadi* sheep with merino sheep imported from U. S. S. R. in consonance with the breeding policy advocated by the Government of India. This programme will be taken up in Saurashtra and Kutch and a Twenty Year Plan has been drawn by the Department of Animal Husbandry. The first batch of merino sheep from Russia has already arrived at Nalia farm.

The State Government would locate the exotic rams with the breeders and assist the breeders in maintaining the rams in good condition during the first year. The physical and financial targets for the Fifth and Sixth Plans are shown below :—

Fifth Five Year Plan

Scheme	Target	Year					Total	Remarks
		First	Second	Third	Fourth	Fifth		
Cross breeding with exotic rams	Physical ..	600	700	800	1000	1200	4300	No. of exotic rams located with breeders
	Financial .. (Rs. in lakhs)	3 00	3 50	4 00	5 00	6 00	21.50	

Sixth Five Year Plan

Scheme	Target	Year					Total	Remarks
		First	Second	Third	Fourth	Fifth		
Cross-breeding with exotic rams	Physical	1,200	1,200	1,200	1,200	1,200	6,000	No. of exotic rams located with breeders
	Financial (Rs in lakhs)	6 72	6 72	6.72	6 72	6.72	33 60	

Intensive Sheep Development Programme

6.4.8 2 Nalia and surrounding sea coast area in Kutch is very well known for production of good quality local wool. The sheep strength is 80,000 sheep and mostly the flock owners are stationary. It is proposed under intensive sheep development programme that an all round endeavour will be made for sheep and wool improvement through intensified activities The second unit is proposed in Bhavnagar district during the Sixth Plan By the end of the Fourth Five Year Plan the number of sheep covered under extension activities would be 5.56 lakhs. It is proposed to extend the services to additional 4.00 lakhs of sheep population under each Plan. Nearly 85 per cent of the sheep population will receive the benefits of these services by the end of Sixth Plan. The physical and financial targets for the Fifth and Sixth Plans are shown in the table below :—

TABLE

Fifth Five Year Plan

Item	Target	Year					Total	Remarks
		First	Second	Third	Fourth	Fifth		
Project Unit	Physical	..	..	..	..	..	50,000	Sheep coverage.
	Financial (Rs in lakhs)	1.40	0 90	0.90	0.90	0 90	5 00	
A. I. Centre	Physical	10,000	10,000	10,000	10,000	10,000	50,000	Ewes inseminated
	Financial (Rs. in lakhs)	1.50	0 50	0 50	0 50	0.50	3.50	
Community shearing shed.	Physical	1,000	2,000	3,000	4,000	5,000	15,000	Sheep shorn
	Financial (Rs in lakhs)	0 20	0.30	0 40	0 50	0 60	2 00	
Extension services	Physical (No in lakhs)	0.80	1.60	2.40	3 20	4 00	4 00	Sheep covered (Progressive)
	Financial (Rs. in lakhs)	0 60	1.20	1 80	2 40	3 00	9 00	

practice of animal husbandry extension. The extension wing will also operate a modern ambulatory clinic. The Plan outlays for the above scheme are summarised below :—

Action Items	Fifth Plan Financial outlay (Rs. in lakhs)	Sixth Plan Financial outlay (Rs. in lakhs)
Expansion of the veterinary college	25.00	30.00
Biological product unit	25.00	30.00
Disease investigation units	9.00	18.00
Post-graduate training programme	6.00	15.00
Short training programme and refresher course ..	28.00	32.00
Internship programme	1.00	1.50
Extension wing and ambulatory clinic ..	6.00	10.00
Establishment of cattle and poultry farms for training the students.	..	13.50
	100.00	150.00

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6.4.7.3 The existing slaughter houses in the State are mostly make-shift arrangements, privately operated, and are far too inadequate for the present day requirements. This scheme aims at setting up an experimental modern slaughter house in Ahmedabad municipal area during the Fifth Plan period. Depending upon the increased demand for wholesome meat, two more such slaughter houses will be set up during the Sixth Plan. In addition to the processing and supply of wholesome meat, these institutions will also be able to process and conserve the inedible portions of the carcase which invariably has fairly high demand in the industrial sector. Therefore, the allocations shown below are provided during the two Plans.—

Plan	No. of slaughter houses	Financial outlay (Rs. in lakhs)
Fifth	1	35.00
Sixth	2	50.00

6.4.8 Sheep Development

Cross-breeding with Exotic Rams

6.4.8.1 The Government of Gujarat has accepted cross-breeding of local *patanwadi* sheep with merino sheep imported from U. S. S. R. in consonance with the breeding policy advocated by the Government of India. This programme will be taken up in Saurashtra and Kutch and a Twenty Year Plan has been drawn by the Department of Animal Husbandry. The first batch of merino sheep from Russia has already arrived at Nalia farm.

The State Government would locate the exotic rams with the breeders and assist the breeders in maintaining the rams in good condition during the first year. The physical and financial targets for the Fifth and Sixth Plans are shown below :—

Fifth Five Year Plan

Scheme	Target	Year					Total	Remarks
		First	Second	Third	Fourth	Fifth		
Cross-breeding with exotic rams	Physical	600	700	800	1000	1200	4300	No. of exotic rams located with breeders
	Financial .. (Rs. in lakhs)	3 00	3 50	4 00	5 00	6 00	21 50	

Sixth Five Year Plan

Scheme	Target	Year					Total	Remarks
		First	Second	Third	Fourth	Fifth		
Cross breeding with exotic rams	Physical	1,200	1,200	1,200	1,200	1,200	6,000	No of exotic rams located with breeders
	Financial (Rs in lakhs)	6 72	6 72	6 72	6 72	6.72	33 60	

Intensive Sheep Development Programme

6 4 8.2 Nalia and surrounding sea coast area in Kutch is very well known for production of good quality local wool. The sheep strength is 80,000 sheep and mostly the flock owners are stationary. It is proposed under intensive sheep development programme that an all round endeavour will be made for sheep and wool improvement through intensified activities The second unit is proposed in Bhavnagar district during the Sixth Plan. By the end of the Fourth Five Year Plan the number of sheep covered under extension activities would be 5.56 lakhs. It is proposed to extend the services to additional 4.00 lakhs of sheep population under each Plan. Nearly 85 per cent of the sheep population will receive the benefits of these services by the end of Sixth Plan. The physical and financial targets for the Fifth and Sixth Plans are shown in the table below :—

TABLE

Fifth Five Year Plan

Item	Target	Year					Total	Remarks
		First	Second	Third	Fourth	Fifth		
Project Unit	Physical	..	..	..	..	..	50,000	Sheep [illegible]
	Financial (Rs in lakhs)	1 40	0 90	0 90	0 90	0 90	5 00	
A I. Centre ..	Physical	10,000	10,000	10,000	10,000	10,000	50,000	[illegible]
	Financial (Rs in lakhs)	1.50	0 50	0 50	0.50	0 50	[illegible]	
Community shearing shed.	Physical	1,000	2,000	3,000	4,000	5 000	[illegible]	[illegible]
	Financial (Rs in lakhs)	0 20	0 30	0 40	0.50	[illegible]	[illegible]	
Extension services	Physical (No in lakhs)	0 80	1 60	2.40	[illegible]	[illegible]	[illegible]	[illegible]
	Financial (Rs. in lakhs)	0 60	1.20	1.80	[illegible]	[illegible]		

TABLE

Sixth Five Year Plan

Item	Target	Year					Total	Remarks
		First	Second	Third	Fourth	Fifth		
Project Unit ..	Physical ..	..	..	..	..	..	50,000	Sheep coverage.
	Financial .. (Rs. in lakhs)	1.40	0.90	0.90	0.90	0.90	5.00	
A. I. Centre ..	Physical ..	10,000	10,000	10,000	10,000	10,000	50,000	Ewes insemi-nated.
	Financial .. (Rs. in lakhs)	1.50	0.50	0.50	0.50	0.50	3.50	
Community shearing shed.	Physical ..	1,000	2,000	3,000	4,000	5,000	15,000	Sheep shorn.
	Financial .. (Rs. in lakhs)	0.20	0.30	0.40	0.50	0.60	2.00	..
Extension services	Physical .. (No. in lakhs)	0.80	1.60	2.40	3.60	4.00	4.00	Sheep covered (Progressive)
	Financial .. (Rs. in lakhs)	0.60	1.20	1.80	2.40	3.00	9.00	

Health Control for Migratory Flocks

6.4.8.3 The migratory flocks of sheep sustain considerable losses due to death from diseases and in many cases carry and spread the contagion all along their usual routes. There are at present no arrangements for providing veterinary aid to the flocks. This scheme proposes to set up two check-posts along the routes for prevention and control of diseases in these flocks. The physical and financial targets are shown in the table below :—

TABLE

Fifth Five Year Plan

Scheme	Target	Year					Total	Remarks
		First	Second	Third	Fourth	Fifth		
Health control for migratory flocks.	Physical ..	50,000	50,000	1,00,000	1,00,000	1,00,000	4,00,000	Sheep drenched and vaccinated.
	Financial .. (Rs. in lakhs)	1.00	0.50	1.50	1.00	1.00	5.00	

Sixth Five Year Plan

Scheme	Target	Year					Total	Remarks
		First	Second	Third	Fourth	Fifth		
Health control for migratory flocks.	Physical ..	50,000	50,000	1,00,000	1,00,000	1,00,000	4,00,000	Sheep drenched and vaccinated.
	Financial .. (Rs. in lakhs)	1.00	0.50	1.50	1.00	1.00	5.00	

Wool Grading Centres

6.4.8.4 Two wool grading centres with a capacity to handle 80,000 kgs per year will be operating at Jamnagar and Bhuj by the end of the Fourth Plan. In order to cover prominent wool markets at Mahuva and Rajkot, one centre is proposed under each Plan. The physical and financial targets for the Fifth and Sixth Plans are shown in the table below :—

TABLE

Fifth Five Year Plan

Scheme	Target	Year					Total	Remarks
		First	Second	Third	Fourth	Fifth		
Wool grading centre.	Physical	40,000	50,000	60,000	70,000	80,000	3,00,000	Kgs. of wool graded
	Financial (Rs. in lakhs)	1.00	0.50	1.50	1.00	1.00	5.00	

Sixth Five Year Plan

Scheme	Target	Year					Total	Remarks
		First	Second	Third	Fourth	Fifth		
Wool grading centre.	Physical .	40,000	50,000	60,000	70,000	80,000	3,00,000	Kgs of wool graded
	Financial . (Rs. in lakhs)	1.00	0.50	1.50	1.00	1.00	5.00	

Wool Scouring Plant

6.4.8.5 Introduction of exotic blood in the local sheep will result in increase in quantity of grease in the wool. Raw greasy wool will need removal of dirt and grease prior to its utilisation through spinning. In order to assist village artisans and smaller institutions, small-scale scouring plants are proposed under each Plan. The physical and financial targets for the Fifth and Sixth Plans are shown in table below :—

TABLE

Fifth Five Year Plan

Scheme	Target	Year					Total	Remarks
		First	Second	Third	Fourth	Fifth		
Wool Scouring Plant.	Physical .	.	20,000	30,000	40,000	50,000	1,40,000	Kgs of Wool Scoured
	Financial .. (Rs in lakhs)	.	2.50	0.50	0.50	0.50	4.00	

Sixth Five Year Plan

Scheme	Target	Year					Total	Remarks
		First	Second	Third	Fourth	Fifth		
Wool Scouring Plant	Physical .	..	20,000	30,000	40,000	50,000	1,40,000	Kgs of Wool Scoured
	Financial .. (Rs. in lakhs)	..	2.50	0.50	0.50	0.50	4.00	

Share Contribution

6.4.8.6 The authorised share capital of the Gujarat Sheep and Wool Development Corporation is rupees one crore. The State Government holds 49 per cent of the share in the corporation. The contribution is proposed to meet the requirements of expansion of the activities. The outlay for the Fifth and Sixth Plans is shown below :—

Fifth Five Year Plan

Scheme	Target	Year					Total
		First	Second	Third	Fourth	Fifth	
Share contribution to Gujarat Sheep and Wool Development Corporation.	Financial (Rs. in lakhs)	..	15.00	..	..	..	15.00

Sixth Five Year Plan

Scheme	Target	Year					Total
		First	Second	Third	Fourth	Fifth	
Share Contribution to Gujarat Sheep and Wool Development Corporation.	Financial (Rs. in lakhs)	..	20.00	..	..	..	20.00

6.4.9 Poultry Development

Poultry Training

6.4.9.1 The Poultry Training Centre established during the Third Five Year Plan at Anand in co-operation with the Institute of Agriculture, Anand, is proposed for reorganisation and continuance during the Fifth and Sixth Five Year Plans. This centre provides training facilities in poultry farming to twenty farmers for a period of three months in Gujarati medium. Such three batches are trained every year. In addition to the above centre, it is proposed to create similar facilities at Surat, Ahmedabad and Junagadh for the participants deputed from the applied nutrition blocks. The table below shows the outlays and targets for the different Plans :—

TABLE

(Rs in lakhs)

	Plan			
	Third	Fourth	Fifth	Sixth
Revenue outlay	0.32	0.50	1.00	1.00
Capital outlay	0.48	..	1.50	..
Total ..	0.80	0.50	2.50	1.00
Physical targets	1 centre	500 farms	3 centres	3 centres
Expenditure	0.65	..	..	..

Co-ordinated Poultry Breeding Programme for the Production of High Laying Strains of Chicks

6.4.9.2 The estimated poultry population of the State is in the vicinity of 25 lakhs of which about 20 per cent is exotic. It is proposed to increase the exotic population which in turn will increase the production of eggs and poultry meat. Government of India, in collaboration with UNICEF and other aid agencies, has imported three pure-bred lines for crossing and production of white Austro Chicks. The breeding programme has been finalised by the Government of India in consultation with the respective State Departments of Animal Husbandry. It is proposed to take up the breeding programme in the regional poultry breeding farms at Surat, Ahmedabad, and Junagadh by increasing the requisite facilities of poultry breeding pens, modernising the hatcheries, etc. At present, the State is in a position to supply about five lakh sexed chicks per year from Government and private hatcheries. It is proposed to increase the capacity to 10 lakhs during the Fifth and Sixth Plan periods. The targets are shown below :—

	Plan			
	Third	Fourth	Fifth	Sixth
Financial outlay (Rs. in lakhs) ..	..	6.61	15.60	10.00
Physical targets . ..	..	3	3 (Expansion)	3 (Reorganisation)

Intensive Poultry Development Blocks

6.4.9.3 The scheme aims at providing the following requisites for the intensification of poultry development:—

(1) Credit facilities through commercial banks.
(2) High laying strains of chicks.
(3) Balanced poultry feed for all the categories of the birds.
(4) Feed additives.
(5) Medicines
(6) Protection against contagious and infectious diseases.
(8) Technical guidance in day to day management problems.
(8) Organisation of co-operative societies of poultry farmers for the organisation of marketing of eggs and poultry to provide remunerative prices for their produce throughout the year.

The model scheme provides for the coverage of 30,000 exotic birds. It is proposed to start two blocks in the Fifth Plan and two more blocks in the Sixth Plan The physical targets and financial outlays are shown below :—

	Plan			
	Third	Fourth	Fifth	Sixth
Provision (Rs. in lakhs)	2.00	9.53	15.00	15.00
Expenditure („)	0.64	..	..	..
Physical targets	1 block	1 block	2 blocks	2 blocks

Applied Nutrition Programme

6.4.9.4 Eggs and poultry meat are very rich sources of animal protein needed by expectant mothers, young ones and children. The scheme envisages poultry production in the villages

coming under applied nutrition block areas of the State by providing the pre-requisite facilities. It is proposed to take up 25 blocks in Fifth Plan and 25 blocks in Sixth Plan. The targets and outlays are shown below :—

	Plan			
	Third	Fourth	Fifth	Sixth
Provision (Rs. in lakhs)		34.00	20.00	22.00
Physical		23 New	25 blocks	25 blocks

Organisation of Marketing of Eggs and Poultry

6.4.9.5 Investments and inputs under the first four Plans have resulted in considerable increases in the production of eggs and meat. The swings in demand during the different seasons and the overwhelmingly unorganised nature of the marketing have hampered the production. Therefore, this scheme proposes to organise the marketing of eggs and meat and to provide such facilities as cold storage, etc., required for an efficient marketing organisation. The physical targets and financial outlays are shown below :—

	Plan				Remarks
	Third	Fourth	Fifth	Sixth	
Provision (Rs. in lakhs) ..	..	Nil	14.00	14.00	
Physical targets Number ..	..	1	2	2	Cold Storages
			6	6	Refrigerated Vans.

Scheme for Strengthening of State Level and District Panchayat Poultry Extension Services and Establishment of Service Centres under Non-I. P. D. B. Areas

6.4.9.6 Poultry development has gained momentum in the State. Investment by the farmers is very heavy in this enterprise. This enterprise needs very strong extension agency for follow up action. As such it is proposed to establish service centres and strengthen the existing facilities in areas which are not covered by the intensive poultry development programmes. The financial outlays and physical targets are shown below :—

	Plan	
	Fifth	Sixth
Provision (Rs. in lakhs)..	11.00	11.00
Physical	Five districts	Three districts

Poultry Development in Dangs

6.4.9.7 The district poultry farm at Ahwa provides poultry extension facilities in Dangs district to the Dangi cultivators who are economically backward. It is proposed to provide more incentives and to strengthen the extension of poultry development in this district to increase the subsidiary income. The financial outlays and physical targets are shown below :—

	Plan				Remarks
	Third	Fourth	Fifth	Sixth	
Provision (Rs. in lakhs) ..	0.12	3.00	4.00	4.00	
Physical	One	..	..	..	Poulty farm.

6.4.10 Equines and Camel Development

Equine Development Programmes

6.4.10.1 The Fourth Plan provisions will enable the expansion of the horse breeding farm for Kathe breed at Junagadh. There is a great demand for these horses from the police and military. This scheme, therefore, proposes to further expand the existing stud facilities and increase the number of the farm stock for breeding purposes. The scheme also provides for establishing facilities for horse breeding in the field areas.

In rural Gujarat, and also to a considerable extent in urban areas, short distance transport of materials is very much dependent on the availability of donkeys. The department so far has not undertaken any measures to provide for improvement of the donkeys in the State. Therefore, in the Fifth and Sixth Plans, token provisions are made for programmes of developing the donkeys.

Financial outlays of Rs. 7.64 lakhs and Rs. 8 52 lakhs are proposed for equines development in the Fifth and Sixth Plans respectively.

Camel Development

6.4.10 2 The camel breeding farm at Bhuj needs expansion in order to cope with the demand for camels in Kutch and other areas This scheme proposes to expand the farm to increase the availability of camels. Financial outlays of Rs. 4.75 lakhs and Rs 5.65 lakhs are proposed during the Fifth and Sixth Plans respectively.

6.5 Summary

A summary of the physical targets and financial outlays on all the schemes for Animal Husbandry and Dairy Development during the Fifth and Sixth Plans is given in the table below :—

TABLE

Part I—Consolidated statement of milk production and dairy development schemes

Scheme	Fifth Plan		Sixth Plan	
	Physical	Financial (Rs. in lakhs)	Physical	Financial (Rs. in lakhs)
1	2	3	4	5
I. Milk Plants	Lts/day		Lts/day	
1 Junagadh creamery	20,000	10 00	30,000	20.00
2. Rajkot feeder balancing dairy	75,000	25 00	1,00,000	50 00
3 Bhavnagar feeder dairy	30,000	15 00	60,000	40.00
4. Jamnagar feeder dairy	10,000	10 00	25,000	20 00
5 Surat dairy	75,000	40 00	1,00,000	40.00
6. Baroda dairy	1,25,000	40.00	1,50,000	40 00
7. Katra (Anand)—Fourth Plan target is 8,00,000 litres/day from Operation Flood investments. So token provision for Fifth Plan and provision for expansion during the Sixth Plan	.	20 00	10,00,000	400.00
8. Ahmedabad dairy	2,00,000	75 00	2,50,000	100 00
9 Mehsana dairy—Fourth Plan target is 3,00,000 litres/day from Operation Flood investments. So token provision for Fifth Plan and provision for expansion during the Sixth Plan	..	20 00	5,00,000	400 00

CHAPTER VII

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7.1.2 Forest also provides food and shelter to our precious fauna and gives us recreational centres which are so very much needed in this industrial hectic age.

7.1.3 In order that the forest should play the above roles effectively, it is necessary that it should be well stocked and properly distributed and the area of the forest should be above the minimum percentage, which according to our National Forest Policy of 1952 should be 60 per cent in the hills and 20 per cent in the plains. In our State, the percentage of the forest area is about 8.8 out of which 10 per cent is under private ownership. Almost the whole of the area of forest under private ownership lies in a ruined state. Only the districts of Dangs, Bulsar, Surat and Panchmahals have adequate area under forest, while in the districts of Ahmedabad, Mehsana, Rajkot and Surendranagar the percentage of the forest area is even below 2 per cent of the total land area.

7.1.4 The annual forest production is about 1.64 lakh cu. ms. of timber and 2.06 lakh tonnes of fuel. As against this the need of the State is about 3 lakh cu. ms. of timber and about 32.64 lakh tonnes of fuel. There is, thus, a large gap between production and demand.

7.1.5 Only about 38 per cent of the forest area which lies south of Narmada is well wooded. Here the forest area is fairly compact and fairly protected and receives favourable rainfall. The commercial forest is found in this region. The soil and the climate in Dharampur region of Bulsar district are eminently suited for good quality of teak and other species, including Dhavda and Katas bamboos. Unfortunately, during the last two and a half decades, numerous trees and bamboo clumps have been cut and burnt by the adivasis to bring the land under cultivation both authorisedly and unauthorisedly. The cultivation on steep slopes and in scattered pockets has added very little to the economy of the adivasis, but it has done immense damage to the potentialities of these forests. Rest of the forest area lies in the dry and arid zone. Naturally the per hectare yield from all these forests cannot be high and they cannot produce timber of large size. However, the condition has been considerably worsened by the fact that in this very region, during the last 3 decades or so, the forest lands have come to be given out indiscriminately for cultivation and for other uses, thereby completely honey-combing the forest area and making its protection extremely difficult. These forests are subjected to very heavy incidence of grazing which has compacted the soil and made it structureless. Therefore in the forests of this region, natural regeneration, which is the cheapest method of perpetual

replenishment of the forest, is mostly absent. The quality of the tree growth is poor and annual increment of the wood is low. This forest is also subjected to very heavy illicit cutting. Under the privilege which is granted to the villagers for collection of dead wood from forest for sale, hundreds of small size trees, even the plantations raised at high costs, are being hacked by the villagers to "manufacture" dead wood. To summarise, the position of forests in this State is very precarious and calls for immediate action to remedy it.

7.2 Objectives and Policies for Fifth and Sixth Plans

The objectives will be :

(a) To stop immediately further destruction of the forests by tackling efficiently the causes which have led to destruction of the forest wealth.

(1) In the last few decades, forest lands have come to be given out indiscriminately for cultivation and for other uses. Whenever there was a demand for land, the same was taken up from the Forest Department and the sites demanded were released without any thought for the future management of the forest estate. Compactness of the forest area is essential not only for proper protection, but also for creating a proper micro climate which is essential for vigorous development of the trees. Hence a firm policy should be laid down that hereafter no forest land will be given out for any other use. Government under their Agriculture, Forests and Co-operation Department No. FLD/1271/2650, dated 11th June, 1971 have issued strict orders that no forest lands should be distributed for agricultural purposes and no proposal involving reduction in the forest area should be sanctioned without obtaining the Governor's approval. This should be made as a permanent policy. Large forest areas are asked for rehabilitation of persons affected by various irrigation projects. Such areas should be made available from other sources.

(2) Heavy incidence of grazing is one of the main causes for the low fertility of the forest soils Unless grazing in forest areas is controlled, the trees simply do not stand a chance for survival and growth. Grazing in forest area should be strictly limited to its carrying capacity. For this purpose a survey of soil should be carried out and grazing settlements made which will indicate the number of cattle which can be admitted to the forest areas in various parts. Grazing in the forest areas cannot be controlled effectively unless the forest areas are fenced. Leaving aside a small strip of forest area adjoining the villages, the rest of the forest area should be fenced in the cheapest and most effective way possible.

(3) The public roads passing through the forest areas should be the minimum. All such public roads should be fenced on both sides. At present the forest area is open to all to roam about. Many of the forest fires are caused due to the carelessness of people wandering all over the forest areas. Many of the forest fires are also, however, deliberately set by the villagers for collection of minor forest produce and for catching wild animals. These forest fires cause immense damage to forests and destroy natural regeneration as well as the precious fauna. The entry into the forest area should, therefore, be controlled. Care should be taken to see that the villagers allowed to enter the fenced area do not carry any inflammable material.

(4) The State comprises areas from many of the merged princely States. Each of these princely States had its own forest privileges. These forest privileges have been continued even after merger. In addition, general privileges which were allowed in the Bombay State have been extended to all the areas. The forest privileges have, therefore, become very liberal. There is, therefore, need to rationalise these privileges and standardise them making only such modifications as are absolutely necessary by consideration of local conditions. One of the privileges which has done greatest damage to the forest conservancy is the privilege of collection of dead wood from the forests for sale. The eastern portion of Panchmahals district has now become a barren land as a result of this privilege. As the adivasis are greatly dependent upon the forests for their livelihood, the destruction of the tree growth will act against them and it is in their own interest that this privilege should now be abolished.

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(5) At present the minor forest produce is being collected by villagers without any direct supervision of the forest officials. This is resulting in unscientific collection of minor forest produce thereby damaging the source from which the minor forest produce is collected. One of the important minor forest products is bamboo. The villagers cut bamboos at a high level as only the central portion is required by them. As a rule, young bamboos are cut as they are on the periphery of the bamboo clump and are easily pliable for preparation of the various articles from bamboos. This results in destruction of this important species on which not only the villagers but also certain industries like paper pulp depend. Henceforth all bamboos should be exploited departmentally and then cut bamboos should be made available to the villagers. As a rule, the people who require bamboos should be employed by the department in carrying out the exploitation so that they will not have to pay the cost of exploitation.

(6) The forest offences are on the increase. One of the reasons for this is that, of late, under public pressure, the offences are being dealt with very lightly. This encourages the offenders to carry out their nefarious activities. As preservation of forest is in the national interest, the forest offences should be dealt with ruthlessly so as to make commission of such offence a prohibitive proposition.

(7) The set-up of the Forest Department requires a change in view of the changed conditions. In the present set-up a forest guard has, on an average, a jurisdiction of about 10 to 15 sq. kms. The guard has not only to protect the forest but he has also to attend to various silvicultural operations such as planting, cleaning, thinning, supervision over the work of exploiting agencies, etc. In the past when the forest areas were compact, forest roads were few and the traffic was mostly by bullock carts, it was possible to protect the forest wealth with only one guard for about 10 to 15 sq. kms. Conditions have now changed drastically. There is, therefore, a need to augment the forest staff. There should be separate staff exclusively for the protection of the forest and it should be provided with fast moving vehicles, arms and ammunition and walkie talkie sets for quick detection of forest offenders and apprehending them.

(8) One of the causes for the increase of offences is that the price of forest products has shot up and it is now beyond the reach of an average person to purchase these products. Naturally, the tendency is to commit offences to secure what they want. In the villages, there are no shops from which the small size timber and fuel required by the villagers can be made available. They have to go a long distance to the towns where they can secure their needs by paying exorbitant prices. Hence fair price shops should be established within easy distance of the forest villages. From these shops timber of the required size and fuel should be made available at reasonable rates.

(b) To consolidate the existing forest area and manage it most intensively.

The existing schemes cover all aspects of management. No new schemes are considered necessary. The existing schemes should be continued and their tempo increased to the maximum extent possible.

(c) To bring additional areas under forest by taking over from the Revenue Department whatever lands that are available for afforestation along the coast, along the semi-saline periphery of the Rann of Kutch and in compact blocks from surplus wastelands in the interior and by acquiring private forest lands.

(1) Gujarat has a long strip of coastal line from Bulsar in the south to Kutch in the north-west. The coastal strip is sandy and uneven. During the latter part of summer and early part of monsoon, strong desiccating winds blow from the sea. As a result, there is considerable wind erosion and the adjoining agricultural fields are buried with sand; and the agricultural crops are scortched by the desiccating winds. It is, therefore, necessary that the whole coastal sandy tract should be immediately brought under permanent vegetative cover. In addition to protecting agricultural lands, such plantations will provide timber and fuel needed by the public, enhance the aesthetic beauty of the coastal line, and provide picnic spots for the public.

A large coastal strip has already been afforested. The remaining stirp requires to be taken from the Revenue Department and afforested urgently.

(2) The Rann of Kutch is a vast stretch of saline waste land which is devoid of any vegetation. Not even a blade of grass grows in this area. During the summer, hot winds blow from this desert carrying the saline soil The adjoining cultivated fields are, therefore, very seriously affected. Until irrigation is available, the main portion of the Rann which is highly saline cannot be afforested. However, the semi-saline strip bordering the Rann can be planted with salt tolerant species by proper soil management. An area of 22,000 hectares has already been so planted. Very little area, which is suitable for plantation, is now available with the Revenue Department. However, areas with panchayats in Sami and Harij talukas of Mehsana district can be taken over, with their consent, for afforestation. When the irrigation facilities from Narmada Project become available, seeding of the area from the air may be considered.

(3) Most of the waste lands in charge of the Revenue Department are either subjected to heavy grazing or are under cultivation. The scope for securing compact blocks of surplus waste lands for afforestation is limited. However, as these waste lands hardly serve as a *gaucher*, the possibility of taking over portions of such *gaucher* lands for afforestation, where they adjoin the existing forest lands, may be considered.

(4) Gujarat has a large network of roads and canals. There is great scope for establishment of avenues along these roads and canal banks. This will considerably add to the aesthetic beauty of the countryside and make travelling in the summer comfortable. It will also give added resource for timber and fuel. Creation of roadside plantations has been undertaken since the year 1969. Only a modest beginning, however, has been made. But the success achieved so far is quite promising. The activity, therefore, requires to be considerably stepped up so that the avenues can be established along all the roads and canals within as short a period as possible.

(5) Other avenues for increasing the area under forest should be investigated. For this, a systematic land capability and land utilisation survey should be undertaken for the areas in charge of Government and the panchayats, so that the areas suitable for management as forests can be determined and be placed in the charge of the Forest Department.

(b) To educate the public in the importance of forests and help the panchayats various institutions, industrial estates and individual agriculturists in planting trees in lands in their charge by giving them necessary technical and financial help.

In order that the extension service should be effective and yield some concrete result, only a few villages should be taken up to start with. Here, the attempts at extension service should be concentrated. Trees take a long time to mature and yield financial return. The revenue which is derived from the trees is less than from other avenues which are open for investment of capital. However, trees not only benefit the individual who plants them, but also benefit the whole region in various ways described above. Hence it would be in the interest of the State to give suitable incentive to panchayats and individuals to induce them to plant trees in their lands.

7.3 Schemes in Fifth and Sixth Five Year Plans

7.3.1 Forest Consolidation

7.3.1.1 The object of this scheme is to constitute into reserve forest the wooded areas taken over from the former princely States, demarcate them on the ground, and get them surveyed through the Survey of India. This is a continuous scheme. Most of the work of forest settlement is already over. The balance work is expected to be completed before the end of the Fourth Plan. Preparation of topo-sheets through Survey of India would be completed during the Fifth and Sixth Plans. There is considerable area under cultivation, both authorised and unauthorised, in these forests. This cultivation should be shifted outside the forest area or on the border of the forest to facilitate future management of the forest.

7.3.1.2 The area under forest in this State is very low. It is, therefore, necessary to bring additional areas under forest wherever it is feasible. With this aim in view the land capability and land utilisation survey should be taken up and completed in the whole State during the Fifth and Sixth Plan period. On the basis of this survey concrete schemes can be framed to bring additional lands under forests.

7.3.1.3 At present an area of 1660 sq. kms. is under private forests. These areas will be acquired through the Revenue Department during the Fifth and Sixth Plans. Areas out of these private forests, which are considered suitable for economic management as forests, will be taken over under forest administration.

7.3.1.4 Outlays of Rs. 50 lakhs and Rs. 76 lakhs are proposed during the Fifth and Sixth Plans under this scheme as against the Fourth Plan outlay of Rs. 0.5 lakh.

7.3.2 Working Plans

7.3.2.1 This is a continuous scheme. Working plans are under preparation for the wooded areas taken over from the former princely States. Five working plans have already been prepared. Three more working plans will be completed before the end of the Fourth Plan. The remaining working plans will be prepared during the Fifth Plan.

7.3.2.2 As a rule, a working plan is revised once in 10 years. Revision of working plans is, however, a normal work and should be attended to by the normal working plan staff of each circle.

7.3.2.3 An outlay of Rs. 5 lakhs has been provided during the Fourth Plan and a similar outlay of Rs. 5 lakhs has been provided during the Fifth Plan. There will be no plan expenditure in the Sixth Plan on this scheme.

7.3.3 Improved Logging

7.3.3.1 Logging by improved implements is necessary to avoid wastage. 28 rangers and 4 officers have been trained in the modern logging classes conducted by the Government of India with Swiss collaboration. 20 sets of modern tools were also received by the Government of India from the Swiss Government. Only some of these tools are useful for Gujarat and they are now being manufactured in our country. The staff already trained in turn trains forest labourers in the use and maintenance of modern logging tools.

7.3.3.2 One percent of the total expenditure on logging is permitted for purchase of modern tools by the societies. As the Conservator of Forests is the head of the Wage Board, which sanctions the item of expenditure incurred by the societies, there is adequate check of the department over the purchase of such tools. However it would be better if the tools are purchased by Government and supplied to the societies so that quality is ensured.

7.3.3.3 Outlays of Rs. 8 lakhs and Rs. 15 lakhs respectively are proposed in the Fifth and Sixth Plans as against the outlay of Rs. 4.05 lakhs during Fourth Plan.

7.3.4 Economic Plantations and Plantations of Fast-growing Species.

7.3.4.1 This is a scheme for plantation of valuable species of teak, khair and bamboos and the fast growing species like eucalyptus in the exploited forest areas. Normally, most of the trees give coppice shoots after exploitation, and plantation in about 10 per cent of the exploited area is sufficient for maintaining the existing forest. But large areas of forests in Gujarat have generally been over exploited and denuded and it is considered appropriate to plant about 20 per cent to 25 per cent of the area exploited annually.

7.3.4.2 An area of about 28,000 hectares is exploited annually, *i. e.* the total area that would be exploited within a period of five years will be 1,40,000 hectares. Out of this, an area of 29,000 hectares will be planted up during Fifth Plan and slightly more area in the Sixth Plan.

7.3.4.3 Financial outlays of Rs. 161 lakhs and Rs. 200 lakhs are proposed in the Fifth and Sixth Plans respectively as against the outlay of Rs. 126 40 lakhs in the Fourth Plan.

7.3.5 Afforestation and Soil Conservation in Coastal, Desert and Denuded Areas

7.3.5.1 A total area of about 11,000 hectares is available for plantation along the sea coast. An area of 5,658 hectares will be planted by the end of the Fourth Plan. The remaining area will be planted during the Fifth and Sixth Plans. However, as these are planted with fast-growing species, these areas become available for exploitation and replantation after 15 to 20 years, and so areas already planted more than 15 years ago have become due for exploitation and replantation.

7.3.5.2 Afforestation of semi saline areas was started from 1951 and has been completed in most of the available sites. An area of about 22,000 hectares has been planted under this scheme. Such plantation will be continued and undertaken if any more sites become available.

7.3.5.3 Most of the forest area is from merged States and a large part of it has been denuded during the past management. The area of such denuded forests is about 1.5 lakh hectares and about one third of it is plantable Elaborate soil and moisture conservation measures are needed in these areas. The object of afforestation in these areas will be to provide small size timber and firewood for local needs and grass for storage for meeting the needs in scarcity.

7.3.5.4 It is proposed to carry out afforestation and soil and moisture conservation work in 20,000 hectares and 25,000 hectares of saline/desert, coastal and denuded areas during the Fifth and Sixth Plans respectively as against the target of 11,000 hectares during the Fourth Plan. Financial outlay of Rs 144 lakhs and Rs 225 lakhs are proposed in the Fifth and Sixth Plans as against the outlay of Rs. 20 80 lakhs (excluding the provision under central sector rural works programme in chronically drought affected areas and also excluding the provision under soil conservation sector in the State Plan) in the Fourth Plan.

7.3.6 Extension Forestry

7.3.6.1 Gujarat has a very large net work of roads and canals. These roadsides and canal banks require to be planted with shady and ornamental trees and trees of some utility. The Forest Department has recently started plantation along the roadside and canal banks. The experience has been very happy and the rate of survival has been very high It is, therefore, proposed to take up the programme of roadside and canal bank plantation over 1000 kms and 2000 kms. respectively during the Fifth and Sixth Plans. Roads of importance and high incidence of traffic will be selected for this purpose

7.3.6.2 A few villages will be selected for starting a pilot project for planting trees and grasses in common village lands and in the fields of individuals. The pilot project should provide for complete follow up of the trees planted. Experience gained in the pilot project will determine the nature and extent of a concrete programme of village forestry, if any, to be taken up in future.

7.3.6.3 Financial outlays of Rs. 100 lakhs and Rs. 200 lakhs respectively are proposed for the Fifth and Sixth Plans on this scheme as against the outlay of Rs. 30 lakhs during the Fourth Plan.

7.3.7 Forest Protection

7.3.7.1 Eight mobile squads, 5 police squads, 54 Jodi guards and 15 checking nakas established during the Fourth Plan will be continued during the Fifth and Sixth Plans. Similarly the walkie talkie sets established in Dangs for quick detection of fires will also be continued. In addition, a few areas which are very vulnerable to commission of forest offences will be selected for special protection. Here a separate establishment of Range Forest Officers and Guards will be created exclusively for the protection of these areas. This special staff will not

be given any other duties except that of protection. It would be provided with fast moving vehicles and equipped with arms and walkie talkie sets. The experience will be watched, and if found effective will be extended to other areas.

7.3.7.2 After setting aside a small strip of forest adjoining the villages, a large programme of fencing the rest of the forest area and public roads passing through these areas will be taken up. The areas will be closed to grazing permanently. Similarly a programme for plantation of agave in a wide strip along the contours and compartment boundaries will be taken up as a protective measure against the spread of fire.

7.3.7.3 An outlay of Rs. 35 lakhs and Rs. 53 lakhs is proposed in the Fifth and Sixth Plans respectively as against the outlay of Rs. 19.50 lakhs in the Fourth Plan.

7.3.8 Wild Life

7.3.8.1 The existing wild life sanctuaries in the State will be developed. In addition, the forest area at Ukai will also be constituted into a sanctuary. The Gir sanctuary which is the only natural habitat of the Asiatic Lion will be constituted into a National Park. The Maldharies residing in the nesses in the sanctuary area will be shifted and settled on surplus waste lands in charge of the Revenue Department and on a portion of the sanctuary area on the outskirt which would be deleted and handed over to the Revenue Department for this purpose. The existing habitation within the sanctuary area will be demolished. The whole sanctuary area will then be fenced with rubble wall supported by five rows of live hedges of prosopis juliflora and other thorny species. No grazing by domesticated cattle will then be permitted in the closed area. It is expected that after the closure, the development of the flora and fauna will be more rapid. Steps will be taken to carry out soil and moisture conservation measures in the whole area, to establish check dams, to create perennial source of water all over the sanctuary area and to provide salt licks, etc. Under the auspices of the Smithsonian Institute of Yale University, the Natural History Society of Bombay has established a biological research centre at Gir. This research centre is collecting very valuable data about the ecology of lions and other ungulates. This research work will be continued.

7.3.8.2 Similarly other sanctuaries will be developed. The new sanctuary to be created at Ukai has immense possibility and may ultimately turn out to be one of the best sanctuaries in India.

7.3.8.3 A financial outlay of Rs. 50 lakhs and Rs. 70 lakhs is proposed in the Fifth and Sixth Plans respectively as against the outlay of Rs. 12.00 lakhs in the Forth Plan.

7.3.9 Development of Pastures and Construction of Godowns

7.3.9.1 Grass is one of the most important needs of the rural population. Certain forest areas located in Panchmahals district and in peninsular Gujarat have been set apart for production of grass and storage of surplus for scarcity years. Most of these areas are in a deteriorated state and produce hardly 150 to 200 kgs. of grass per hectare. Fencing is *sine qua non* for success and hence the scheme provides for such fencing. It also provides for soil and moisture conservation measures and for plantation of superior variety of grasses. The scheme also makes provision for construction of godowns for safe storage of the grass cut from the *vidis* for use in years of scarcity.

7.3.9.2 The need for increased production of grass is also connected with dairy development and establishments of improved herds of cattle can be located near the grass godowns, if drinking water is available.

7.3.9.3 Outlays of Rs. 70 lakhs and Rs. 175 lakhs are proposed during the Fifth and Sixth Plans respectively as against the outlay of Rs. 29.12 lakhs in the Fourth Plan under this scheme.

7.3.10 Research

One conservator of forests is in charge of research and working plans and has 4 research stations under him. These stations carry out research on the local problems of forestry, artificial regeneration, suitability of different species for different localities, improved nursery practices, seed trials and such other aspects of forest management and silviculture. Research will be continued and strengthened. Outlays of Rs. 25 lakhs and Rs. 45 lakhs are proposed during the Fifth and Sixth Plans respectively as against the outlay of Rs. 10.23 lakhs in the Fourth Plan.

7.3.11 Training

The divisional forest officers, sub-divisional forest officers, range forest officers, foresters and forest guards are required to be trained in forestry science. Since 1960, 800 forest guards, 360 foresters, 71 range forest officers and 16 divisional forest officers / assistant conservators have been trained. The present untrained staff will have to be trained. An outlay of Rs. 16 lakhs and Rs. 25 lakhs is proposed during the Fifth and Sixth Plans respectively as against the Fourth Plan outlay of Rs. 10 lakhs.

7.3.12 Miscellaneous

There are various other schemes like construction of buildings, communications, planning and statistical cell, forest publicity, botanical garden, etc, which shall be continued and strengthened according to the needs from time to time. The present scheme of labour welfare shall be deleted and financial assistance to forest labour can be given in the Co-operative Sector as forest labour is organised on co-operative lines. The total outlays proposed on these miscellaneous schemes are Rs. 140 lakhs and Rs. 250 lakhs during the Fifth and Sixth Plans respectively, as against the Fourth Plan outlay of Rs. 82.40 lakhs on them.

7.4 Outlay

The total financial outlay proposed under Forest Sector is Rs. 804 lakhs during the Fifth Plan and Rs. 1,334 lakhs during the Sixth Plan as against Rs. 350 lakhs during the Fourth Plan.

7.5 Some Special Matters

7.5.1 The Government have set up an Ecological Council. In making developmental plans, special care will have to be taken to see that the balance of nature is not unduly disturbed Already many undesirable consequences of unplanned development have manifested themselves. Environmental problems are expected to assume very great importance in the future and will need to be tackled effectively. It is heartening to know that the State Government has set up the Council of Ecology. It is, however, necessary that the council is strengthened both organisationally and financially so that it can become an effective agency for advising Government on all ecological problems. Legislation may be necessary in a number of cases. The advice of the council should particularly be sought and invariably followed in matters pertaining to conservation of forests and wild life.

7.5.2 An afforestation [illegible]
chronically drought affected a[illegible]
to the schemes in the State's [illegible]
in chronically drought affected areas should be continued on a priority basis, even after the expiry of the Central Sector Rural Works Programme, until a saturation point is reached, as these works constitute an effective drought proofing measure.

7.5.3 There are other centrally sponsored programmes like Forest Resources Survey in the Forest Sector and Ravine Reclamation and Afforestation and Soil Conservation in Dantiwada River Valley in the Soil Conservation Sector, which should be pursued vigorously.

Bank and so on. It is hoped that central assistance as envisaged above will be forthcoming during the next Plan period but even if it is not available, the provision will have to be made in the State Plan budget for development of harbours as it is felt that no progress in fisheries development is feasible without making requisite provision for adequate facilities for landing and berthing at the above mentioned ports Therefore, the State's Plan outlay will have to be increased by Rs 650 lakhs during the Fifth Plan and Rs. 185 lakhs during the Sixth Plan to meet with the requirements of development of harbours.

8.1.2 Large Vessel Operation with Foreign Aid

8.1.2.1 Due to the richness of fishing grounds and the encouragement offered by the State, financially and technically, the size of the mechanised fishing fleet has been increasing steadily. Sufficient technical know-how for operating small trawlers has already been generated. It is, therefore, most appropriate to step into the next stage of introducing bigger trawlers for commercial exploitation of the deep sea. Many fishermen of Veraval areas are already operating 13 6 metres trawler and their average catch per hour is 250 kgs of fish.

8.1.2.2 Financial incentives should be offered to the boats taking up the designs of trawling and gill netting so that the advantages of combination fisheries can also be taken. The 17.4 metre trawlers can fish for 240 days in a year and explore off shore waters For fishing in areas beyond 50 fathm large steel vessels of 21 95 metres and 27 43 metres are necessary These boats can fish for 280 days to 300 days in year. These types of vessels are not constructed in the country at present and hence need to be imported. It is necessary here to give some thought to foreign aid.

8.1.2 3 In most of the developing countries such as in Central and South America, Africa and Asia, progress in fisheries development has been achieved with large scale investment in export oriented industry by obtaining financial and technical assistance offered by the foreign agencies. Gujarat is also badly in need of such assistance especially in the field of 'deep sea fishing' and 'fish processing'. It is, therefore, considered important to take advantage of one of the offers of foreign assistance from large fishing companies of USA, Maxico, Norway, Poland etc. The foreign investor may supply big trawlers of 21.95 metres and 27.43 metres, freezing plant, fish meal plant and technical personnel. The capital cost involved in supply of the above equipment shall be around Rs. 200 lakhs. The recurring cost by way of salaries, etc, is estimated to be Rs. 7 5 lakhs per annum The foreign exchange earnings are estimated to be Rs. 240 lakhs per annum.

8.1.3 Requirement of Trained Personnel

8.1.3 1 The increase in landings at a rapid rate is only possible if large trawlers for deep sea fishing are commissioned The trend is now definitely set in for commercial exploitation of deep sea resources and at present there is an acute shortage of trained technical personnel, particularly of certificated skippers, fishing second hands, engineers (fishing vessels) and the deep sea drivers. This shortage is mainly due to the requirements prescribed under the Indian Merchant Shipping Act, 1958 It is necessary that separate rules are immediately framed for the fishing vessels under the Indian Merchant Shipping Act, 1958. Till such time, it would be essential to have a separate unit of Central Institute of Fisheries Operatives established in Gujarat on the lines and pattern of existing CIFO, Ernakulam. On the basis of envisaged introduction of 1,075 small, medium and large size trawlers (out of which 375 small sized and 50 medium / large size trawlers will be required during the Fifth Plan period), the demand for certified skippers and engin ers will be quite impressive and hence need of having a unit of CIFO established in the State is strongly felt even before the actual commencement of Fifth Plan.

8.1 3 2 Apart from the requirements of the operating crew, it will also be necessary to have properly trained staff for undertaking the development activities and giving proper guidance to the entrepreneurs. The overall requirement of trained personnel is very large and unless a special training programme is taken up in the State itself, the personnel as required will

never be available and the development programme will naturally suffer. The requirement is shown below :—

Sr. No.	Category of personnel	Yearwise requirements during the Fifth Plan						Additional requirement during Sixth Plan	Requirement of trained personnel by the end of Sixth Plan
		1974-75	1975-76	1976-77	1977-78	1978-79	Total 1974-79		
1	2	3	4	5	6	7	8	9	10
1	Skipper ..	10	15	15	15	25	80	200	280
2	Bosun ..	10	15	15	15	25	80	200	280
3	Engine Driver ..	175	175	175	200	250	975	1,000	1,975
4	Assistant Engineer/ Assistant Driver.	75	100	125	125	150	575	750	1,325
	Total ..	270	305	330	355	450	1,710	2,150	3,860

Remarks :— (A) These trained personnel will also meet the requirements of private entrepreneurs alongwith those of Government sponsored agencies.

(B) (i) In addition to above requirement, many persons will be required for handling, preservation, processing and transport of fish.

(ii) Establishment of ancillary units like boat building, net making, engine and other fishing equipments, and manufacturing and maintenance units will also need a good number of personnel.

(iii) Implementation of various projects will need personnel of technical, technological and managerial categories.

(C) It is broadly estimated that Plan outlay envisaged during the Fifth Plan will create job opportunities for over 30,000 persons and during the Sixth Plan for over 50,000 persons.

Details regarding ship crew basically required for manning a vessel of each category are mentioned below :—

Each 17·37 metre trawler will require the following personnel :—

(a) Skipper .. .. One
(b) Bosun .. .. One
(c) Engineer .. .. One
(d) Assistant Engineer .. .. .. One
(e) Deckhand .. .. Four

Each 21·95 metre trawler will require as under :—

(a) Skipper .. .. One
(b) Bosun .. .. One
(c) Driver .. .. One
(d) Assistant Driver .. .. .. One
(e) Deckhand .. .. Six

Each 27·43 metre trawler will require as under :—

(a) Skipper .. .. One
(b) Assistant Skipper .. .. .. One
(c) Bosun .. .. One
(d) Driver .. .. .. One
(e) Assistant Driver .. .. .. One
(f) Deckhand .. . . Eight

A processing expert will also be required on vessels which have that facility on deck.

8.1.3.3 The fishermen population in Gujarat is fairly scattered and the total population is about 2.5 lakhs. Of these, the concentration is on the Umbergaon-Kolak belt in South Gujarat, and the Jaffrabad-Porbandar belt in Saurashtra. Of these, the number of active fishermen is about 39,000. However, a number of persons who do not belong to the fishermen community are also taking to fishing in small numbers. It is envisaged that with the availability of better facilities and opening up of the field of fisheries more and more persons not belonging to the fishermen community would also be attracted to this field and will seek employment in the fisheries sector. It is those persons also who would, to a fairly substantial extent, make up the shortage of the trained and technical personnel required for fisheries.

8.1.4 Marine Exploratory Surveys

Charting of important fishing grounds and dissemination of this vital information for development of industry should find a place of prime importance in any long term planning and as such it is envisaged to introduce extensive exploratory surveys for coverage of the entire coast during the Fifth and Sixth Plan periods. It is also felt necessary that this survey may be conducted by the Survey Team of FAO or, if it is not feasible, the equipment and know-how required for this type of survey be obtained from FAO or similar foreign agency.

8.1.5 Modern Processing

The landings of exportable varieties of fish like prawns and lobsters have to be frozen for supply to foreign markets. It is, therefore, essential to set up plate freezer, IQF, brine freezer and accelerated freeze drying units, etc. Financial incentives will be given to public bodies taking up advanced processing methods.

8.1.6 Need for Establishment of Fisheries Board

8.1.6.1 The production of fish in the State for the purpose of (i) providing nutritious food at a comparatively low cost, (ii) as a source of cattle and poultry feed, (iii) as a base for setting up ancillary industry, and (iv) for earning foreign exchange for the country can be increased considerably and quickly. It is envisaged that the annual fish production can be increased to 4 lakh tonnes and 8 lakh tonnes at the end of the Fifth and Sixth Plans respectively. To have these targets of enhanced production, it is essential to invest a sum of Rs. 21.50 crores during the Fifth Plan and Rs. 36 85 crores during the Sixth Plan. This primary investment will have a multiplier effect and would generate employment opportunities of vast magnitude. It is estimated that employment opportunities will be created for more than 30,000 jobs during the Fifth Plan and more than 50,000 during the Sixth Plan.

8.1.6.2 For exploitation of rich natural resources at an accelerated rate and for integrating various developmental projects in the public, co-operative and private sectors, so as to ensure even and balanced development of fisheries, it is essential that a Fisheries Board is established in the State, which

(i) shall have overall control on all aspects of fisheries development in the State;
(ii) shall co-ordinate the entire Government efforts towards fisheries development; and
(iii) shall undertake all activities of development at present being undertaken by the Department of Fisheries, and these would especially include :

(a) exploration and survey of fishing grounds;
(b) provision of infra-structure facilities including harbours ;
(c) research on all aspects of fisheries ;
(d) training;
(e) helping the exploitation on a commercial scale of the fishing resources with a view to enhancing fish production;
(f) integrating the activities of the co-operatives and the private enterpreneurs in a manner suitable for an even growth of the fishing industry;
(g) ensuring systematic marketing;

(h) taking effective steps for the export of fish and fisheries products so as to ensure increased foreign exchange earnings (Rs. 15 crores per annum at the end of Fifth Plan and Rs. 30 crores per annum at the end of Sixth Plan);

(i) rendering effective assistance to the fishermen and their co-operatives for obtaining better prices for the catch;

(j) looking to the welfare of the fishermen and working for their amelioration;

(k) any other aspects that would be necessary to ensure faster development of fisheries.

8.1.6.3 The establishment of such a Board would provide the necessary organisation of high efficiency and magnitude for the development of the industry and promotion of trade on an extensive scale. It is, therefore, recommended that if fisheries development is to be made on a large scale in the minimum possible time, it is necessary that a Board, charged with extensive powers, duties and responsibilities as stated above, may be set up immediately, replacing the present Department of Fisheries.

8.1.6.4 The Board of Fisheries would have a Chairman at the Head and he will be the main co-ordinating and controlling person. He will be assisted by (1) Member (Administration and Marketing), (2) Member (Technical), (3) Member (Survey and Training), (4) Member (Research), and (5) Member (Finance). The Board should have an organisation as shown in the Chart.

8.1.6.5 The Board shall be the final authority on the expenditure and control of finances after Government has made the allocations.

8.2 Programmes and their Implementation in the Fifth and Sixth Plans

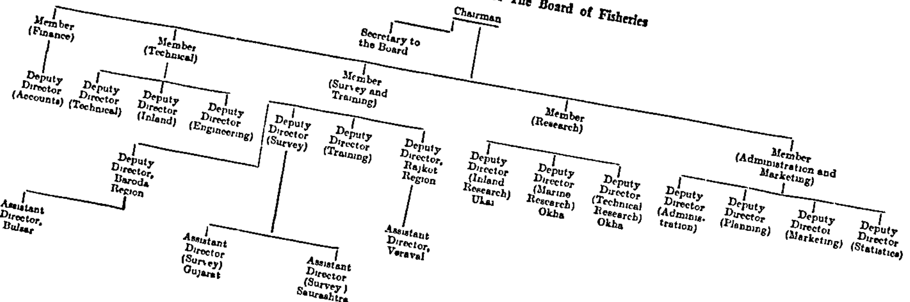
As stated earlier, marine resources of the State, replete with large quantities of commercial and exportable varieties of fish, are at present under-exploited and as such offer very good scope for increasing marine landings. It is, therefore, envisaged to have a Plan outlay of Rs. 21.5 crores (inclusive of proposed outlay of Rs. 6.5 crores on development of harbours) during the Fifth Plan and an outlay of Rs. 36.85 crores (inclusive of Rs. 1.85 crores for harbours) during the Sixth Plan period. It is expected that implementation of various projects will yield 2 lakh tonnes of additional fish prouction during the Fifth Plan and 4 lakh tonnes of additional fish production during the Sixth Plan.

8.2.1 Development of Fisheries Harbours

8.2.1.1 Fishing harbours constitute an important link between the actual operations of catching fish in the seas and the delivery in fresh condition to the processors and consumers. Having regard to the need for giving the fishermen the maximum amount of time for fishing operations and considering the perishable nature of the commodity, every facility has to be provided for handling the fish in the harbour with the least possible delay. Development of central facilities for the provision of essential services, such as berthing, maintenance and repairs of fishing boats, supply of fishery requisites and landing, handling and auctioning of fish is of crucial importance for the development of fishing industry.

8.2.1.2 Establishmet of fishing habours in selected centres is thus an essential pre-requisite for the development, organisation and expansion of the fishing industry. The technical details of the works to be proposed during the Fifth and Sixth Plans for the development of harbours are given in the Appendix. In the following paragraphs, an endeavour is made to give cost-benefit analysis in relation to proposed increase in fishing activities at each harbour, on completion of the development works planned as indicated in the Appendix. It may be mentioned here that the pace of development of the fishing industry will largely depend on the development of harbours, but the immediate availability of harbours will not necessarily mean immediate returns. Harbours will be the catalyst for quicker development.

Organisational Chart of The Board of Fisheries



Veraval

8.2.1.3 Looking to the need of the developing fishing industry, it can be seen that it is of paramount importance that Veraval gets all the facilities as enumerated in the Appendix and becomes an all weather port. Even with nine months fishing, Veraval lands almost 40 per cent of the total catch in Gujarat. The landings here will continue to increase in the same proportion considering that the known fishing grounds exist off the coast here. If, however, the breakwater is constructed and Veraval becomes an all weather port, the fishing season will be extended by another three months and there will at least be an additional 10,200 tonnes of fish landing even without any increase in the present fishing fleet. With the introduction of large mechanised vessels, the increase per annum will be more than 40,500 tonnes at the end of the Fifth Plan itself. Even if we take the conservative value at Rs.750 per tonne of fish landing, the annual return directly would be almost the cost of constructing the breakwater. It can be seen that the indirect benefits will be far more. The benefits that will result will far outweigh the costs that will be required for the works envisaged at Veraval. It may also be mentioned that, when the harbour gets the basic facilities for large vessels to operate all the year round, there will also be a substantial increase in the landings of prime fish which will help increase the foreign exchange earnings of the country.

Jaffrabad

8.2.1.4 The next in priority for development would be the Jaffrabad fishing harbour. Jaffrabad is the most important centre for Bombay duck fisheries which is the single largest fishery in Gujarat. As can be seen from the details in the Appendix, some work has been done and some more is required. The earlier this work is completed the quicker will be the subsequent development of fisheries. Jaffrabad also falls in the zone of known grounds but the fishing here is by and large seasonal. If the basic facilities as planned are provided at Jaffrabad, it is estimated that the fish landing there would increase by at least 60 per cent. The landing at Jaffrabad is estimated to be about 45,900 tonnes. With the increased facilities, it can reach at least 76,500 tonnes. It is obvious that even the basic increase in the value of landings will be far in excess of the money required for the development of the harbours. Since a fairly substantial amount of Bombay duck is exported, this will also help increase the foreign exchange earnings of the country.

Porbandar

8.2.1.5 Almost as important a fishing harbour as any other in Gujarat is Porbandar. It is situated in the surveyed fishing belt of the Saurashtra coast and the landings include fish similar to that at Veraval. Since the population of fishermen was somewhat large at Veraval, the latter developed faster as a fishing port. The potential, however, at Porbandar is almost the same. Furthermore, with the construction of an all weather port at Porbandar, it stands to reason that fisheries development here can really be stepped up and the percentage increase in landings here can be the highest in the State. The work planned at a cost of Rs. 148 lakhs as shown in the Appendix should be undertaken immediately. To-day the estimated landing at Porbandar is around 8 to 10 thousand tonnes. With the development of the all weather port and the fishing harbour, the landings can go up to at least 76,500 tonnes. The increase in the value of the landings would be more than twice the investment in the harbour. This would also bring in a large number of fish based industries whose contribution to the country's economy, both by way of foreign exchange earning and providing labour, would be very substantial.

Umbergaon

8.2.1.6 The development of fisheries in South Gujarat is to a great extent retarded because of the non-availability of a proper fishing harbour, apart from other factors. Unless one good fishing harbour comes up in South Gujarat, it stands to reason that the development there will never be accelerated. As it is, a large number of local fishermen go and land their catches at Satpati in Maharashtra. If a port in South Gujarat could be developed, the landings of the State would increase and it would provide the necessary incentive for the fish based and ancillary industries to develop. It is with this background that the importance of Umbergaon is there. At

present the landings at Umbergaon are hardly 10,200 tonnes. With the provision of the facilities as shown in the Appendix, the landings would be more than doubled. This itself would justify the quicker completion of the harbour and the benefits would justify the costs.

Madhwad

8.2.1.7 Madhwad is another port in Saurashtra area which is acquiring importance as a fishing base bacause of the availability of a large percentage of exportable varieties of fish. Since this falls in the Veraval zone, it would be very necessary to develop this as a subsidiary port to avoid overcrowding at Veraval and Porbandar. It also has a fairly large fishing population and if the harbour facilities are improved, these fishermen will undoubtedly opt for larger and better equipped boats and the landings are bound to go up. The estimated landings in Madhwad to-day are 3,264 tonnes. If the harbour is developed as envisaged in the Appendix, the landings should go up to at least 7,650 tonnes at the end of the Fifth Plan. Madhwad would also attract the larger vessels from the neighbouring ports like Velan, Kodinar, etc

Jakhau

8.2.1.8 There are some preliminary reports showing that the Kutch coast is also very rich in prime fish. Unfortunately, there are no proper harbour facilities except at Kandla that can encourage the introduction of bigger and better vessel for fishing in the area. Some surveys are also being carried out by the departmental vessels and it is felt that the best base for any fishing operations would be at Jakhau. Jakhau has the advantage of a natural fishing harbour and with the establishment of good fishing grounds off this port, it is natural that this port would become a major fishing harbour. At present, the landings are very small but if the facilities proposed in the Appendix are provided, the landings can be more than 5,100 tonnes at the end of the Fifth Plan. The percentage increase here will be very high as the resources here are almost untapped. Apart from the direct benefit of increased landings, this will also be of tremendous advantage for the development of Kutch, at present a very undeveloped area. The development of Jakhau would also have some very obvious advantages as it is almost on the western border of our country

Navabundar

8.2.1.9 Since Bombay duck contributes about one third of Gujarat's fishing effort, it stands to reason that ports where this fish is landed are given their due priority for development. Jaffrabad no doubt stands foremost in this category. Navabundar is already a well established fishing harbour and the annual landing is around 11,220 tonnes. Many fishermen even now do not land their catches here because of the inadequate infrastructure facilities. With the increase in these facilities and the development as planned in the Appendix, the landings should reach at least 20,400 tonnes. The benefits accruing thereby would more than balance the costs

Kolak

8.2.1.10 The development of fisheries in South Gujarat, as mentioned earlier, is seriously handicapped because of inadequate infrastructure facilities. It is, therefore, very essential that ports where there is a substantial fishermen population are immediately taken up for development to ensure the even development of fisheries in the State. Kolak is one such harbour where, with a very small investment, the tangible returns can be very substantial. The works planned in the Appendix will more than justify the cost as the benefit by way of increased landings, introduction of better boats, and the establishment of fish based and ancillary industries would be far in excess of the expenditure on the development of this harbour.

8.2.2 Marine Fisheries Development Programme

8.2.2.1 Engines, Boats and Requisites requirement

At present fishing is mostly confined in inshore areas and hence emphasis during next Plan periods will be mainly on introduction of small, medium and large size trawlers for exploitation

of offshore and deep sea regions. The individual fishermen and their co-operatives will be given financial incentives and technical know how for engines and boats as shown in the table below :—

TABLE

Boats	Fifth Plan	Sixth Plan	Engines (HP range)
Improved designed boats	375	250	5-15
Small trawlers	375	500	25-150
Medium and large size trawlers	50	150	210 and above
	800	900	

Along with supply of boats and engines as above, it is envisaged to distribute 400 tonnes of nylon nets during the Fifth Plan and 600 tonnes during the Sixth Plan.

8.2.2.2 Transport

(*i*) *Road Transport.*—For effective and efficient handling of fish, it would be essential to increase transport facilities, and for that purpose, the fleet of 50 trucks and vans expected at the end of Fourth Plan will have to be increased to 100, *i.e.*, 50 new will have to be added during the Fifth Plan. During the Sixth Plan, a target of 100 additional trucks/vans will be necessary so that at end of Sixth Plan, the total fleet of 200 trucks/vans will be available.

(*ii*) *Rail Transport.*—As regards rail transport, it is envisaged to introduce container service for export as well as for internal markets. A container service will be useful and economical only when it is run on a two way traffic and hence some arrangements will have to be planned by which it can, on return, bring some items of import. It is envisaged to have 5 such services per annum so that at the end of Sixth Plan, there would be 50 such services.

(*iii*) *Sea Transport.*—Major bulk of fish will be transported by road and hence a small increase in sea traffic is envisaged. It is stated that there will be 25 carrier launches at the end of Fourth Plan which will have to be increased to 35 (10 new) at the end of Fifth Plan which would be further increased to 40 (5 new) at the end of Sixth Plan.

(*iv*) With the increased landing of exportable varieties of fish, it is envisaged that processing for export will be done in Veraval and Porbandar itself. This will require transport facilities for frozen, canned and dried fish as well as fish meal from Gujarat to foreign ports. It is envisaged that Gujarat would be in a position to offer fish cargo of about Rs.15 crores annually at the end of the Fifth Plan and Rs. 30 crores annually at the end of the Sixth Plan period. For this purpose arrangements will have to be worked out with shipping lines for the exports of fish cargo. Some fish may also be thought to be airlifted. But since the air freight is so high, the quantity that is lifted may be almost negligible.

8.2.2.3 Handling, Processing and Freezing

As regards providing facilities for freezing and processing, Government will have to continue offering financial incentives for setting up freezing plants and processing units that may come forward during the 10 years period. However, for introduction of latest and advanced techniques in the field of freezing such as IQF and accelerated freeze drying unit, etc, it is necessary that projects are taken up by the Government sponsored agencies. Incentives for introduction of new processing techniques with a view to enhancing utility and marketability will have also to be extended.

8.2.2.4 Fish Meal

The increased fish production will also include trash fish in abundance which can b converted into fish meal. It is envisaged that the annual production of fish meal would i by 5,000 tonnes in of Fifth Plan and 10,000 tonnes in the Sixth Plan. It is propos financial assistance in the form of loan and subsidy for the necessary equipment will be lakhs during the Fifth Plan and Rs. 20 lakhs during the Sixth Plan.

8.2.2.5 Canned Fish

In the years to come, canned fish food is bound to gain popularity and, therefore, taki into account the consumer preference, it is envisaged to have 5 plants at the end of Fifth Pla (out of this one is expected by the end of Fourth Plan) and 15 (10 new) running at the end o the Sixth Plan.

8.2.2.6 Fishing industry being still in the infant stage (inshore fishing), and the fishermen being backward, it would be necessary to continue financial incentives for introduction of large vessels and modern equipment as required for large scale fishing operations. A sum of Rs. 10.35 crores will be required during Fifth Plan and Rs. 27.40 crores during Sixth Plan period for integrated development of marine fisheries.

8.2.3 Inland Fisheries Development Programme

8.2.3.1 Unlike marine fishery where efforts are mainly directed towards capture of fish and its preservation, inland fishery requires intensive efforts right from the stage of seed conception to its delivery and rearing into fingerling (fish) stage. The development efforts of the State so far have succeeded in producing required number of quality fish seeds and it is necessary that efforts at production of fish seeds are intensified during the next two Plan periods. The present fish production from inland areas is a very negligible quantity and looking to the area of water sheets available (PWD estimates give 0.68 lakh hectares at present which would be increased to 1 50 lakh hectares at the end of the Fourth Plan, which will be further increased to 2 08 lakh hectares at the end of the Fifth Plan and 2.32 lakh hectares at the end of the Sixth Plan) it is possible to have fish production of 15,000 tonnes at the end of the Fifth Plan and 25,000 tonnes at the end of the Sixth Plan.

8.2.3.2 For attaining the above target of fish production, efforts will have to be made to obtain sufficient number of quality seeds through (i) induced breeding methods, (ii) riverine collection, and (iii) induced breeding under artificial hatcheries

8.2.3.3 It is planned to have 3 such artificial hatcheries during the Fifth Plan which can be increased to 8 during the Sixth Plan. Introduction of artificial hatcheries will minimise dependence on rains and hence normal supply of seeds can be ensured. The following items are also planned for development of inland fisheries :-

(i) The number of fish farms for stocking and rearing of fish to fingerling stage envisaged at the end of Fifth Plan would be 15 and at the end of the Sixth Plan 25.

(ii) The rearing of spawn will require adequate rearing space (nurseries). It is planned to have 10 hectares of nursery space at the end of the Fifth Plan, and 16 hectares at the end of the Sixth Plan.

(iii) For inland fishing, the requirement of nylon nets is estimated at 50 tonnes during the Fifth Plan and 75 tonnes during the Sixth Plan. Establishment of one net making unit or expansion of the existing unit to meet with the increased demand will have to be given thought during the Fifth Plan period.

(iv) There is no mechanised method of fishing at present in inland areas. It is proposed introduce 150 boats during the Fifth Plan and 200 boats during the th Pla f

which 35 will be mechanised during the Fifth Plan and 75 during the Sixth Plan. Mechanisation will be either with installation of small HP inboard engines or outboard motors.

(v) The training and research programme will have to include (i) new techniques of fishing, (ii) gear research and (iii) training of fishermen in catching fish from inland areas. In addition, research on (i) production of fish seeds carps and other varieties, (ii) study of ecological changes in reservoirs and tanks, (iii) study of water pollution, (iv) fish culture, etc., will be undertaken during the Fifth Plan and continued during the Sixth Plan.

(vi) The pilot project for introducing frog culture, with a view to increasing population of quality frogs for export market, will have to be envisaged during the Fifth Plan and activities should be intensified during the Sixth Plan.

(vii) It is envisaged to cover an area of 40,000 hectares besides Ukai reservoir under inland fish culture at the end of the Fifth Plan and equal additional area, *i.e.*, 40,000 hectares will be covered at the end of the Sixth Plan.

8.2.3.4 With a view to organising fishing activities on scientific lines in the irrigation reservoirs so as not to affect adversely the irrigation facilities for other purposes, it would be seen that uniform and regulated procedure is introduced and followed by all pisciculturists. The development of inland fisheries on the scale as envisaged would require an outlay of Rs. 1.5 crores during the Fifth Plan and Rs. 2.3 crores during the Sixth Plan period.

8.2.4 Co-operatives and Social Upliftment of Fishermen

8.2.4.1 The planned efforts at development of fisheries will have to keep in view the social upliftment of fishermen also and for that purpose, the standard of life of fishermen will have to be elevated. The standard of living will no doubt improve with the increase in the earnings but some attempt will have to be planned for improvement of their standard of life. It is envisaged to form housing co-operatives of fishermen wherein 90 per cent of the contribution may be in the form of loan from Government and 10 per cent should be contribution from the fishermen themselves. The houses of two types according to cost, *viz.*, (1) Rs. 7,500 and (ii) Rs. 5,000, will be constructed. Government may extend interest-free loans for building the houses. Land, if Government owned, can be provided free or if privately purchased, it should be subsidised. This way, it would be possible to plan for 250 houses during the Fifth Plan and 500 houses during the Sixth Plan.

8.2.4.2 It is also proposed to have marketing co-operatives of fishermen who will be extended marketing loans. These societies can do the work of consumers' co-operatives also. Management subsidy can be considered in respect of those societies taking up work of consumers' co-operatives also.

8.2.4.3 If any co-operative society dealing with marketing activity comes forward with the project of market exploration and research, such project need to be financially assisted by subsidising some expenditure on these aspects. This way, co-operatives would be encouraged to take up market exploration and research. A sum of Rs. 10 lakhs and Rs. 20 lakhs will be spent in the Fifth and Sixth Plans respectively.

8.2.5 Marketing

8.2.5.1 Marketing of fish (fresh and dry) will have to be handled mostly through public bodies, if the benefits are to accrue largely to the fishermen who are directly engaged in fishing. The export of fish will have also to be done either through one agency or under one brand name to be sponsored by the State Government so as to ensure uniform quality at all times. A State inspection agency will be necessary.

8.2.5.2 Marketing survey will have to be done for the exploration of new markets and marketing research will also be necessary to cater to ever changing consumer's preference. It is

proposed to have a Market Research Wing in the proposed Board. Marketing loans may have to be granted to the public bodies dealing with marketing of fish. Financial incentives will have to be given on transport of fish and fishery products for export abroad. It is also necessary to establish marketing stalls in important consumer centres through co-operatives. A sum of Rs. 20 lakhs and Rs. 60 lakhs will be spent in the Fifth and Sixth Plans respectively.

8.2.6 Exploratory Survey and Research

8.2.6.1 The programme of charting out new fishing grounds for optimum exploitation is a continuous programme of fisheries plans. It is envisaged to complete the first phase of the programme of covering up to 25 fathom of fishable area of sea by the end of the Fifth Plan. For this purpose, it is necessary to have a total operative fleet of 5 vessels (42.8 metre OAL). It is also envisaged to have survey of 25-50 fathom off Saurashtra coast from Jaffrabad to Okha with a total operative fleet of five 17.4 metre vessels, during the Fifth Plan which would be continued in the area of Kutch coast from Okha to Mandvi and then in the area off South Gujarat during the Sixth Plan period. For survey of deep sea fishing areas, it is envisaged to introduce one 21.95 metre survey vessel during the Fifth Plan and one 30 metre survey vessel during the Sixth Plan.

8.2.6.2 For intensifying research activities during the Sixth Plan period it may be necessary further to have 2 more exploratory survey-*cum*-research vessels of 42.8 metre OAL. It is also proposed to introduce one factory ship at an estimated cost of Rs. 50 lakhs for carrying out processing research. This factory ship is proposed to be of 90 metre OAL. As recommended earlier, it would be quite appropriate if assistance from foreign agencies like FAO, etc., is made available for survey and exploratory programme of the State. The findings of these vessels will be disseminated to the fishermen, co-operatives and all those interested in the development of trade and industry.

Financial Outlay on Survey and Research

8.2.6.3 It is envisaged that a total amount of Rs. 2 crores will be required towards capital investment. The operational cost per annum will be Rs. 20 lakhs during the Fifth Plan and Rs. 35 lakhs during the Sixth Plan.

Research (Marine Biological Research Station, Okha)

8.2.6.4 Oceanographical and hydrobiological research will be continued at Okha. Plankton studies, *i.e.*, primary productivity research will be intensified during these Plan periods.

Research (Technological)

8.2.6.5. The subjects that will be dealt with include (*i*) pearl fishery, (*ii*) edible oysters, (*iii*) crabs, (*iv*) window pane oysters, (*v*) chank fishery, (*vi*) sea weeds, (*vii*) turtles and (*viii*) processing technology.

raft and Gear Research

8.2.6.6 The subjects that are planned for study will include (*i*) boat designs, (*ii*) boat terial, (*iii*) standardisation of gear material, (*iv*) engine studies, (*v*) deck equipment and boat preservation.

nsion and Publicity

2.6.7 It is planned to publish and disseminate results of these research programmes and, t purpose, an extension and publicity wing is proposed to be attached to the Marine cal Research Station, Okha.

8.2.6.8 The operational cost for research is envisaged to be Rs. 10 lakhs per annum during the Fifth Plan and Rs. 15 lakhs per annum during the Sixth Plan. On an aggregate, a sum of Rs. 2 crores during the Fifth Plan and Rs. 3 crores during the Sixth Plan will be required.

8.2.7 Training

8.2.7.1 As emphasised earlier, trained personnel for effective and efficient handling of any project are a fundamental pre-requisite for its success. Looking to the need of large number of trained personnel required for efficient handling of mechanised crafts and trawlers, it would be necessary to have one separate unit of CIFO, on the basis of the Ernakulam unit, estabilshed in Gujarat where training in the regional language can be imparted.

8.2.7.2 The departmental officers and the personnel required for industry in other aspects of fishing such as processing, inland fishing techniques, etc., will be sent for training to the various institutes outside the State and the country. It is proposed to earmark an amount of Rs. 15 lakhs during the Fifth Plan and Rs. 40 lakhs during the Sixth Plan for this purpose.

8.2.8 Statistics and Supervision

No future planning of any industry can be made without adequate basic statistical data of the potential for that industry. It is, therefore, essential that machinery for collection, compilation and interpretation of statistical data is strengthened during the next two Plans. Supervision and evaluation of projects at every stage is another important aspect of long term planning. It would be, therefore, essential to strengthen administration also during the Fifth and Sixth Plan periods. An amount of Rs. 30 lakhs and Rs. 50 lakhs will be required for these aspects during the Fifth and Sixth Plan periods.

8.2.9 Buildings and Residential Quarters

Most of the fishing centres do not have buildings and quarters at present and hence it is necessary to provide these facilities at important centres. It is envisaged to earmark a provision of Rs. 40 lakhs during the Fifth Plan and Rs. 60 lakhs during the Sixth Plan for this aspect.

8.2.10 The development of fisheries in the State has reached a 'take off' stage now and it is quite necessary that investment as planned above is made by the Government so as to provide necessary impetus and incentive for accelerating its pace. If Government shows the way, the fishermen and the industry will certainly follow.

CHAPTER IX

CO-OPERATION

9.1 The co-operative development programme was first started in the country to provid credit to agriculturists. Theoretically, the scope of co-operation can embrace all activities relatec to agricultural production by enrolling all individuals engaged in agricultural production and allied activities as members, processing and marketing all agricultural produce, and replacing the existing trade channels by a chain of consumers' stores, etc. In practice, however, it may be found that marketing and processing of some agricultural commodities, for various reasons, can be handled more efficiently outside the co-operative sector. Moreover, co-operation being a voluntary activity, there may be some who may not wish to join it for one reason or another. Though co-operation has been playing its role in spheres like agricultural production, finance, credit, marketing, processing, distribution, housing, insurance, transport, etc , agricultural credit still remains the main plank of co-operation, provision of adequate and timely agricultural credit being of crucial importance for the sustained growth of agricultural production.

9.2 Objectives and Policies for the Fifth and Sixth Plans

9.2.1 The object of covering all villages of the State by primary agricultural credit societies has largely been achieved, yet there are villages which are not served effectively as some societies are either dormant or not viable. The main object should, therefore, be to ensure service to all villages by viable primary agricultural credit societies, the gap, if any, being filled up by the nationalised/commercial banks.

9.2.2 The membership of service co-operative societies should be increased to 22.80 lakhs, that of labour contract societies to 0.55 lakh, and that of industrial co-operatives to 1.5 lakhs, by the end of the Sixth Plan.

9.2.3 The co-operative credit structure should advance short and medium term credit up to Rs. 115 crores by the end of the Fifth Plan and Rs. 150 crores by the end of the Sixth Plan.

9.2.4 The Land Development Bank should advance long term loans up to Rs 168 crores during the Fifth Plan and Rs. 200 crores during the Sixth Plan.

9.2.5 The remaining requirements of agricultural credit will be met by the nationalised/commercial banks which should advance Rs. 150 crores in the Fifth Plan and Rs. 200 crores in the Sixth Plan.

9.2.6 Agricultural credit should be linked with marketing and processing in the co-opera-ive sector.

9.2.7 Wherever feasible, processing and marketing of agricultural commodities may attempted in the co-operative sector.

9.2.8 The supervisory and statistical establishment should be expanded in accordance with ing needs.

2.9 The existing schemes of financial assistance under co-operation should be continued panded

grammes for the Fifth and Sixth Plans

Though the co-operative movement was first started in India to provide credit to sts, it has now embraced many fields Still agricultural credit remains the main plank

of co-operation. A definite policy for orgainzing societies at the village level was adopted and a programme for organising societies has been carried out during the past Plans. As the objective of covering all villages by primary co-operative societies has been achieved,it is necessary to strengthen co-operatives by making them viable units. A programme for making societies viable has already been undertaken. Societies which are not viable or are not likely to be viable will be wound up and the areas served by these societies will be included in the areas of operation of other viable societies. It is estimated that out of about 8,000 societies at present, about 6,500 societies will survive as viable societies.

9.3.2 Membership

9.3.2.1 Having made co-operative societies available at the village level for all villages of the State, the next objective should be to cover all persons in need of co-operative services. As these societies are mainly agriculture based and as the main population of villages consists of agriculturists, most of the members who have joined primary co-operative societies are agriculturists. After the concept of the multipurpose societies and service co-operative societies, the policy has been to enrol as members all sections of the rural population, agriculturists, landless labourers, artisans,etc. Even then the stress will have to be continued on enrolling all agriculturists as members as that would help in implementing the agricultural production programme. The scope of development in this regard would be to cover all *khatedars* of the State. This would again, however, be only a theortical possibility as some agriculturists would not like to join co-operatives and some agriculturists would not be admitted by societies for various reasons. The broad objective should, therefore, be to cover 95 per cent of *khatedars*. However, as now the policy is to check fragmentation, it may be expected that the number of *khatedars* might not increase appreciably. At present there are 13.08 lakh members, the total number of *khatedars* being 22.41 lakhs. The scope of enrolling *khatedars* as members and the broad objective in this regard should be to raise the membership of *khatedars* to 21.30 lakhs.

9.3.2.2 In addition to *khatedars*, about 11.30 lakhs are landless labourers. As in any industry, so in agriculture also, labour has an important role to play and hence it is felt that the landless labourers should also be enrolled into primary co-operative societies. This is all the more necessary when instead of agricultural credit societies, broad-based village service co-operative societies are organised wherein the whole village population, including agriculturists, artisans (those artisans for whom separate co-operative societies cannot be organised) and landless laboureres, etc., is proposed to be covered. These service societies are expected to provide service to all members. Agricultural labour might require seasonal credit to satisfy domestic needs and the loans thus disbursed can be retired out of wages earned at the time of agricultural operations from agriculturists, who would also be members of co-operative societies. So far, no systematic efforts to enrol landless labourers into co-operatives were made, and only a beginning is now being made in this direction. The broad objectives for the period 1974-84 should be to enrol 50 per cent of such landless labourers as members in co-operatives. In order to bring 5.65 lakh landless labourer s eventually within the co-operative fold, it is proposed to enrol 1.10 lakhs members from this section during the period 1974-84. These labourers are also being organised into labour contract co-operatives societies. It is estimated that one half of the persons proposed to be brought within the co-operative fold, *i. e.*, about 0.55 lakh would be enrolled as members of labour contract societies and an equal number would be enrolled into service co-operative societies.

9.3.2.3 A large number of persons are engaged in cottage and small scale industries. Efforts have been made during the past Plan to bring such artisans into co-operative societies, wherever possible. These efforts should be continued. The concept of service co-operative society envisages not only catering to the needs of agriculturists but also of other classes of rural population engaged in production. Where the number of such artisans is large enough in an area for formation of a separate industrial co-operative society, it can be so formed. However, where the number of such artisans in an area is quite small and a separate industrial co-operative society cannot viably be formed, such persons should be enrolled into local service co-operative societies. The number of persons engaged in different industrial activities as available in the latest survey taken in 1959-60 to 1960-61 is 3,37,471 (say 3.4 lakhs). Industrial co-operative

societies can be organized only where there is concentration of artisans. Industries like handloom weaving, leather working and tanning, dyeing and printing jari works, metal works, cane and bamboo, etc., are such where artisans are generally concentrated. It is proposed that about 1.5 lakh artisans should be brought within the co-operative fold by organising separate industrial co-operative societies. The remaining 1.9 lakhs should be enrolled into local service co-operatives. As this stress of service co-operative societies embracing all sections of rural population is laid down recently, it may be reasonably expected that 50 per cent of them, *i. e.*, about 0.95 lakh can be enrolled into service co-operatives during the Fifth and Sixth Plans.

9.3.2.4 Summarizing, the programme for the period 1974-84, so far as membership of co-operative societies is concerned, should be to enrol 95 per cent of *khatedars*, *i. e.*, 21.30 lakhs, 25 per cent of the landless labourers (besides 25 per cent to be enrolled into labour contract societies), *i. e.*, 0.55 lakh, and 50 per cent of those artisans who cannot be organized into separate industrial co-operative societies, *i. e.*, 0.95 lakh, into service co-operative societies. This would raise the total membership of service co-operative societies to 22.80 lakhs. Moreover, the membership of industrial co-operatives will increase to 1.5 lakhs and the membership of contract societies will increase to 0.55 lakh by the end of the Sixth Plan.

9.3.3 Short and Medium Term Credit

9.3.3.1 The main task of co-operative societies is to provide production finance to members. The approach of relating finance to the value of the property held and to the title thereto has been given up and a more rational and scientific way of relating credit to production need has been introduced. Credit is now being extended on the security of the anticipated crop. The current level of loan granted is Rs. 78.46 crores (1969-70). The exact amount of finance required for production purposes can be assessed, if the production plan of each member is prepared. As this task requires large resources and technical personnel, it is not attempted except in districts where the intensive agricultural development programme has been introduced. Till the stage of preparing production plan is reached, a practical method of fixing the scale of production finance per acre for each crop by the bank, after consulting the interests concerned is being followed. Banks decide the scale of finance for dry farming and irrigated farming separately. The scales of dry farming vary at present from Rs. 100 per hectare to Rs. 250 per hectare and those for irrigated farming from Rs. 250 per hectare to Rs. 2000 per hectare, the scale being even higher for intensive and high yielding programme. With this rate of finance, the agriculturist has to employ certain labour of his own, in addition to the loan obtained from the bank. The agricultural practices are also improving and agriculturists are called upon to follow intensive methods of agriculture. With the introduction of improved and intensive method, the scale of finance for the same crop in the same tract will have to be increased. Looking to the trend of increase in finance provided by primary service co operatives during last nine years, it can be assessed that co-operatives will advance Rs. 115 crores by the end of the Fifth Plan and Rs. 150 crores by the end of the Sixth Plan.

9.3.3.2 The requirement of production finance for dry farming at the rate of Rs. 150 per hectare would be Rs. 11,760 lakhs. The requirement of production finance for irrigated farming at the rate of Rs. 375 per hectare would be Rs. 6,900 lakhs. Thus the total requirement would be Rs. 18,660 lakhs. As the scope of enrolling members from *khatedars* has been taken at 95 per cent of the total number of *khatedars* and as all *khatedars* who join co-operatives may not borrow the whole amount on the above scale, the requirement of agricultural finance may be estimated at 80 per cent of the above amount, *i. e.*, Rs. 14,928 lakhs say, Rs. 150 crores.

9.3.3.3 The above finance has to be provided by the three tier structure of co-operative credit, *viz*, State Co-operative Bank at the appex level, Central Co-operative Banks at the intermediate level, and primary co-operative societies at the village level. A State Co-operative Bank has already been organized and is working. District Central Co-operative Banks have been organized in all districts except Dangs district and, therefore, there is no further scope for organisational work in this regard. The District Central Co-operative Banks have a programme of opening branches for catering to the needs of the societies and for expanding credit extension facilities. Against 184 talukas and mahals in the State, these Banks have already opened 386 branches. There will

be some scope and necessity for further opening of branches at market centres. Regarding primary co-operative societies also, there will be no scope or necessity for new organisation as described earlier as all villages have already been covered.

9.3.4 Long Term Credit

9.3.4.1 In addition to the short and medium term loans, an agriculturist requires long term loan for development of land and increasing the productivity of land. Provision of this type of loan is quite important for increasing agricultural production. Section 116 of the Gujarat Co-operative Societies Act indicates the purposes for which loan can be advanced by the Land Development Bank.

9.3.4.2 Providing irrigation facilities to agriculturists is a major factor for registering increase in production. Though irrigation is provided by small, medium and large irrigation projects executed by the Government as Plan schemes, yet the dug wells and pumping sets constitute the chief source of irrigation in Gujarat. Loans for construction of new wells and repairs of old wells and pumping sets form the major portion of total loans advanced by the Land Development Bank. Dug wells and pumping sets will continue to be a major source of irrigation in view of the limited irrigation potential in the State from surface waters. In addition, construction of wells will also be necessary (i) for supplementary irrigation in the command areas of river valley projects to meet the requirements of special crops, (ii) to supplement water available from the canals when the storage of the dams gets precarious due to inadequate rainfall, and (iii) as a safeguard against the problems of rising water tables, water logging, etc. The pressing demand for well irrigation, however, will be from areas, which are not served by the river projects and which are not likely to be served for at least the coming 10 years. Viewing from this angle, about 2/3rd of the irrigated land will depend on well irrigation until the Narmada Project materialises. Though there is quite a large demand for wells and pumping sets, the number will have to be limited according to the availability of ground water. It is, however, envisaged that there will be brisk demand for wells with pumping units in the command areas of irrigation projects. The construction of wells in the command areas will also help in keeping down the underground water table. If the underground water permits, it will not be unrealistic to assume that practically all potential viable farmers, individually or in group, will go in for a well with a pumping set.

9.3.4.3 The finance required for the above said purpose is being provided by the Gujarat State Co-operative Land Development Bank Ltd., which has also taken up special development schemes under the International Development Association Project. The Bank has advanced loans amounting to Rs. 136.7 crores up to 30th June 1971, an amount of Rs. 110.7 crores out of the said amount being for the development of minor irrigation. Agriculture is being mechanised and the bank is advancing loans for tractors and tractor drawn implements also. Looking to the present trend of long term finance, it is estimated that during the Fifth and the Sixth Plan periods, loans of Rs. 168 crores and Rs. 200 crores respectively would be advanced by the Land Development Bank.

9.3.4.4 A unitary structure of the Land Devlopment Bank has already been established and it has opened branches at the taluka level. No steps for organization in this regard would, therefore, be necessary.

9.3.5 Role of Nationalised Banks

After the nationalisation of commercial banks, one of the important objectives of these banks is to provide finance for priority sectors, *viz.*, agriculture, small scale industry, small borrowers and exports. With expanded activities of the commercial banks, the deposits from the semi-urban and rural areas would increase. It could be suggested that 50 per cent of the deposits of semi-urban and rural branches of all commercial banks in Gujarat and 75 per cent of the incremental deposits of these branches since then should be advanced back to rural areas. As agriculture is the mainstay of rural areas, it can be assumed that 80 per cent of these advances will go to agriculture. It could be suggested that in addition to the provision of short and medium term loans (production credit) of Rs. 115 crores in the Fifth Plan and Rs. 150

crores in Sixth Plan and long term loan of Rs. 168 crores in the Fifth Plan and Rs. 200 crores in the Sixth Plan by the co-operative credit structure, commercial banks may provide loans up to Rs. 150 crores in the Fifth Plan and Rs. 200 crores in the Sixth Plan.

9.3.6 Marketing and Processing

9.3.6.1 Marketing and processing of agricultural produce should be attempted, wherever feasible, in the co-operative sector. However, certain crops will require, for special reasons, different handling, for instance, groundnut.

9.3.6.2 Agricultural credit should be linked with marketing and processing in order to achieve the twin objectives of ensuring a fair return to the rural producers and effective recovery of dues which is a necessary pre-requisite for extension of fresh credit.

9.3.6.3 The existing schemes of financial assistance to marketing societies by way of share capital contribution and subsidy for various purposes should be continued. Subsidy shall, in particular, be extended for construction of godowns by the marketing societies It is expected that the storage capacity of the co-operative societies will increase from 2.3 lakhs tonnes (estimated) at the end of the Fourth Plan to 3.05 lakh tonnes at the end of the Fifth Plan and 4.30 lakh tonnes at the end of the Sixth Plan.

9.3.6.4 It is expected that there will be 165 processing societies excluding sugar factories by the end of the Fourth Plan. The existing schemes for financial assistance to processing societies by way of share capital, loan and subsidy and for cold storage should be continued during the Fifth and Sixth Plans.

9.3.6.5 Some pilot projects should be taken up for supply of fruits and vegetables to selected urban areas. Some co-operative societies should be organized for these pilot projects These co-operative societies should purchase fruits and vegetables from the neighbouring rural areas by paying fair prices to the growers and supply them at reasonable prices to the urban consumers. They should also handle the processing of fruits and vegetables and market the processed products Assistance should be given to the societies for grading of fruits and vegetables, construction of cold storage and by way of share capital contribution. A larger programme should be prepared on the basis of experience gained in the pilot projects

9.3.6.6 An outlay of Rs. 209.3 lakhs is proposed during the Fourth Five Year Plan for marketing and processing societies. Outlays of Rs. 4 crores and Rs. 7 crores respectively are proposed for marketing and processing societies during Fifth and Sixth Plans respectively.

9.3.7 Sugar Factories

9.3.7.1 It is expected that 14 sugar factories will be established in Gujarat by the end of the Fourth Plan. All these sugar factories will be in the co-operative sector. Agricultural credit is linked with marketing and processing in these co-operative societies. The Federation of the Co-operative Sugar Factories of Gujarat has recently proposed that 17 additional sugar factories should be established in Gujarat. The detailed project reports will have to be prepared in order to ascertain the feasibility of each of the proposed sugar factories. [illegible] by the end of the Sixth Plan.

9.3.7.2 Increased quantities of molasses and bagasse will be available with the increase in sugar production. These waste bye products will have to be properly used.

9.3.7.3 It is the practice that the Boards for the co-operative sugar factories are appointed by the Government in the first instance. Great care should be taken to ensure that persons with requisite knowledge and experience are invariably placed on the Board.

9.3.7.4 The existing scheme of financial assistance to co-operative sugar factories by way of share capital contribution should be continued during the Fifth and Sixth Plans. An outlay of Rs. 140 lakhs is provided during the Fourth Plan. Outlays of Rs. 300 lakhs and Rs. 450 lakhs are proposed for the Fifth and Sixth Plans.

9.3.8 Training and Education

The programmes of training and education are implemented through the Co-operative Council. These programmes should be continued and intensified during the Fifth and Sixth Plans. Outlays of Rs. 50 lakhs and Rs. 80 lakhs are proposed during the Fifth and Sixth Plans respectively as against the outlay of Rs. 30 lakhs during the Fourth Plan.

9.3.9 Administrative and Supervisory staff

The present organisation of the Co-operation Department is not best suited to perform its functions with the desired speed and efficiency. The Registrar of Co-operative Societies is over burdened as he is also entrusted with the functions of the Director of Agricultural Marketing, Registrar General of Money-Lending, etc. The department should be reorganised on functional basis. Establishment of an independent Directorate of Marketing has been recommended in Chapter III. It would also be desirable to constitute a separate Directorate of Industrial Co-operatives, including co-operatives for cottage industries, and another Directorate for Agro-industrial Co-operatives. The administrative, supervisory and statistical staff should, therefore, be reviewed immediately and suitably expanded during the Fifth and Sixth Plans in order to meet the growing needs. Outlays of Rs. 30 lakhs and Rs. 40 lakhs respectively are proposed during the Fifth and Sixth Plans as against the outlay of Rs. 20 lakhs during the Fourth Plan.

9.3.10 Co-operative Farming

The existing schemes of assistance for co-operative farming should be continued during the Fifth and Sixth Plans. Outlays of Rs. 15 lakhs and Rs. 20 lakhs are proposed during the Fifth and Sixth Plans respectively as against the outlay of Rs. 7.5 lakhs during the Fourth Plan.

9.3.11 Miscellaneous

The various other schemes like assistance to consumers' co-operatives, assistance to co-operatives of weaker sections, assistance to labour co-operatives, assistance to auto-rickshaw drivers' societies, assistance to banks and societies for encouraging consumers' activities on co-operative lines in rural areas, etc., should be continued during the Fifth and Sixth Plans. All these schemes should be kept under constant review and modified from time to time in the light of the experience that may be gained. Financial assistance should be given to banks and societies for additional credit to small and marginal farmers in order to ensure that their small and marginal holdings are put to proper use. As against the provision of Rs. 46.95 lakhs during the Fourth Plan, outlays of Rs. 100 lakhs and Rs. 200 lakhs are proposed during the Fifth and Sixth Plans respectvely on miscellaneous schemes.

9.3.12 Financial Outlays

As against the total outlay of Rs. 5 crores on Co-operation during the Fourth Plan, outlays of Rs. 9.7 crores and Rs. 15.9 crores are proposed during the Fifth and Sixth Plans respectively.

STATEMENT I

Sectoral and Sub-Sectoral Outlays

(Rs. in Lakhs)

Sr. No	Sector/Sub-sector of Development	Fourth Plan Outlay	Fifth Plan Outlay	Sixth Plan Outlay
1	2	3	4	5
1	**Agricultural Production**			
	(1) Agricultural inputs	483.50	1,700.00	3,300.00
	(2) Education and research	523.00	1,700.00	3,500 00
	(3) Extension and farmers' training	111.00	230.00	500.00
	(4) Agro-Industries	25.00	1,210.00	2,200.00
	(5) Ayacut development	99.00	380.00	800 00
	(6) Dry farming	..	500.00	800.00
	(7) Small and marginal farmers	..	1,000.00	800 00
	(8) Organisation and Statistics	..	20.00	30.00
	(9) Warehousing and marketing	100 00	200 00	400 00
	(10) Others	8 50	20 00	40 00
	Total, Agricultural Production	1,350 00	6,960 00	12,370 00
2	**Soil Conservation**	1,000.00	2,000.00	4,000 00
3	**Land Development**	100.00	..	..
4	**Animal Husbandry and Dairying**			
	Dairy Development			
	(1) Milk plants	..	345.00	1,570.00
	(2) Urban distribution	..	100 00	150 00
	(3) Federation and unions	..	100 00	500.00
	(4) Education and research	..	107 00	150.00
	(5) Milk production enhancement	..	1,538 77	1,417 50
	(6) Administration	..	55 00	70 00
	Total, Dairy Development	..	2,245.77	3,857 50
	Animal Health and Other Livestock Production			
	(7) Animal health and disease control	..	235 00	350.00
	(8) Sheep development	..	74.00	91.10
	(9) Poultry development	..	82.50	78 00
	(10) Equines and camel development	..	12 39	14 17
	Total, Animal Health and other Livestock Production	..	403.89	533.27
	Total, Animal Husbandry and Dairying	850 00	2,649.66	4,390 77
5	**Forests**			
	(1) Forest consolidation	0.50	50.00	76 00
	(2) Working plan	5.00	5.00	..
	(3) Improved logging	4 05	8 00	15 00
	(4) Economic plantations and fast growing species	126.40	161 00	200 00
	(5) Afforestation and soil conservation in coastal, desert and denuded areas	20 80	144.00	225 00
	(6) Village, road side and extension forestry	30 00	100.00	200.00

STATEMENT I—*concld.*

Sectoral and Sub-Sectoral Outlays

(Rs. in lakhs)

Sr. No.	Sector/Sub-sector of Development	Fourth Plan Outlay	Fifth Plan Outlay	Sixth Plan Outlay
1	2	3	4	5
	(7) Forest protection	19.50	35.00	53.00
	(8) Wild life	12.00	50.00	70.00
	(9) Development of pastures and construction of godowns	29.12	70.00	175.00
	(10) Research	10.23	25.00	45.00
	(11) Training	10.00	16.00	25.00
	(12) Miscellaneous	82.40	140.00	250.00
	Total, Forests ..	350.00	804.00	1,334.00
6	**Fisheries**			
	(1) Development of harbours	..	650.00	185 00
	(2) Marine fisheries development	185.00	925.00	2,450.00
	(3) Inland fisheries development	20.00	150.00	230.00
	(4) Preservation and processing	60.00	35.00	90.00
	(5) Transport and communications	20.00	75.00	200.00
	(6) Co-operatives and marketing	30.00	30.00	80.00
	(7) Training	10.00	15.00	40.00
	(8) Survey, research and marine exploration ..	15.00	200.00	300.00
	(9) Supervision and statistics	5.00	30.00	50.00
	(10) Buildings	5.00	40.00	60.00
	Total, Fisheries ..	350.00	2,150.00	3,685.00
7	**Co-operation**			
	(1) Credit	46.20	75.00	100.00
	(2) Marketing and processing	209.35	400.00	700.00
	(3) Sugar factories	140.00	300.00	450.00
	(4) Training and education	30.00	50.00	80.00
	(5) Administrative and supervisory staff ..	20.00	30.00	40.00
	(6) Co-operative farming	7.50	15.00	20.00
	(7) Others	46.95	100.00	200.00
	Total, Co-operation ..	500.00	970.00	1,590.00
8	**Irrigation**			
	Minor Irrigation			
	(1) Tanks and bandharas	1,222.00*	2,420.00	1,180.00
	(2) Tubwells	550.00*	1,800.00	..
	(3) Others	1,250.00	2,500.00	5,000.00
	Total, Minor Irrigation ..	3,022.00	6,720.00	6,180.00
	(4) Multipurpose, major and medium irrigation schemes	10,300.00	20,100.00	22,641.00
	(5) Flood control	700.00	1,500.00	1,700.00
	Total, Irrigation ..	14,022.00	28,320.00	30,521.00

* This does not include provision under the Central sector scheme of Rural Works Programme.

STATEMENT II

Selected Physical Programmes

Estimated Level of Achievement

Sr. No.	Item	Unit	1973-74	1978-79	1983 84	Remark
1	2	3	4	5	6	7
1	*Agricultural Production*					
	(1) Food grains .. .	Lakh tonnes	44.15	60.00	80.00	
	(2) Oilseeds	Lakh tonnes	19.44	20 00	23.00	
	(3) Sugarcane . ..	Lakh tonnes in gur	4 27	7.00	10.00	
	(4) Cotton .. .	Lakh bales of 180 kgs. each	19.69	24 00	30.00	
	(5) Storage capacity— Co-operative societies	Lakh tonnes	2.30	3.05	4 30	
	Ware housing centres.	,,	0 80	1.20	1.80	
2	*Soil Conservation*					
	Contour bunding (Progressive) .	Lakh hectares	12 11	21.56	40.79	
3	Land Development					
	Consolidation of lands ..	No. of villages	2,112	Not Projected	Not Projected	
4	Animal Husbandry and Dairying					
	(1) Per capita consumption of milk.	ml. per day	175	200	240	
	(2) Progressive capacity in organised sector ..	Lakh litres per day.	15.26*	20	30	* reappraised, inclusive of operation flood investments.
	(3) Urban distribution ..	No. of urban areas covered by bulk vending system.	..	5	15	
	(4) Veterinary institutions ..	No.	211	236	266	
	(5) Wool grading	Thousand kgs / year.	80	160	240	
	(6) Poultry development ..	Supply of sexed chicks (in lakhs per year).	5	Not projected	10	
5	Forests					
	(1) Area under quick growing species and economic plantations (Progressive)	Thousand hectares	62.38	81.38	111.00	
	(2) Afforestation and soil conservation in desert coastal, denuded areas (Progressive).	,,	68 72	83.72	113 72	
	(3) Road side and canalside plantations (Progressive)	kms.	200	1,200	3,200	
6	*Fisheries*					
	(1) Annual fish production (Progressive).	Lakh tonnes	2	4	8	
	(2) Mechanisation, inboard engines (Progressive).	No.	1,010	1,510	2,060	
	(3) Construction of improved boats and trawlers (Progressive).	No.	1,040	1,840	2,740	

STATEMENT II—*concld.*

Sr. No.	Item	Unit	1973-74	1978-79	1983-84	Remark
1	2	3	4	5	6	7
	(4) Requisites nylon (Progressive).	Lakh kgs.	5.90	8.90	15.90	
	(5) Transport facilities insulated/refrigerated trucks/vans (Progressive).	No.	50	100	200	
	Insulated/refrigerated carrier launches.	No.	25	35	40	
	Containers („)	No.	..	25	50	
	(6) Freezing and processing plants by co-operatives (Progressive).	No.	..	10	25	
	(7) Annual fishmeal production capacity (Progressive).	tonnes.	500	5500	15500	
	(8) Canning plants (Progressive).	No.	1	5	15	
7	**Co-operation**					
	(1) Membership of service Co-operative societies (*Progressive*)	No. in lakhs	15.50	18.00	22.80	
	(2) Co-operative credit / short and medium term.	Rs. in crores	75.00	115.00	150.00	
	Long term	Rs. in crores	90.00	165.00	200.00	
8	**Irrigation**					
	Minor Irrigation					
	(1) Potential (Progressive) tanks and bandharas	Lakh hectares	2.03	2.51	2.68	Ultimate potential is 2.68.
	Government tubewells	Lakh hectares	0.84	1.42	1.42	1. Rough estimate of ultimate potential from tubewells is 4.37. 2. These potentials will partly overlap with major and Medium irrigation potential.
	Private tubewells	Lakh hectares	0.97	3.08	3.08	
	Dug wells and pumping sets	Lakh hectares	16.28	Not projected	Not projected	
	Co-operative lift irrigation		0.31	Not projected	Not projected	
	(2) Schemes (Progressive)					
	Government tubewells	No.	1,756	2,356	2,356	
	Private tubewells	No.	1,200	3,800	3,800	
	New dug wells,	No. in lakhs	6.11	7.80	Not projected	
	pumping sets	„	2.10	4.17		
	Major and Medium Irrigation					
	(1) Potential (Progressive)	Lakh hectares	8.08	11.68	13.64	Excluding Narmada (ultimate 14.53).
	(2) Schemes (Progressive)	No.	53	104	119	

APPENDIX

Technical details of the works proposed to be undertaken at each fishing harbour in accordance with priority

Veraval

The port is situated in one of the best fishing grounds and is particularly noted for the best varieties of fish which are being exported in large quantities. The development works of the inner harbour area for landing fish catch have been carried out during the previous Plans, but the fishing operations have to be suspended during monsoon

At present there are about 150 medium sized trawlers plying in the region off Saurashtra coast. It is contemplated that Veraval port will be the main base for working and shelter for trawlers operating in the region.

As the inner harbour area is not capable of providing any shelter for continuous working all through the year, it is proposed to convert the present fair weather port to an all weather port by constructing a break-water and extending the existing break-water This will make it possible to work in the port even during monsoon.

The existing break-water on western side shall have to be extended seawards beyond the 4 fathom line to act as a main berak-water against the winds and waves It will also be necessary to provide the break-water on eastern side so as to ensure calm harbour area It is proposed to have 183 metres wide entrance between these break-waters. It is also necessary to have a turning circle of 366 metres diameter to a depth of 8 metres below L.L.W S. so as to provide free turning area for modern deep draft fishing crafts. Since the break-water will extend up to sufficiently deep water, dredging involved for the turning circle and approach channel within the inner harbour area will also be necessary. The channel in the harbour area will be dredged to a level of 5.5 metres below L.L.W.S. It will also be necessary to provide mooring berths as well as navigational aids.

In order to dredge the turning bases, channels, alongside berths, etc., and to maintain the same every year, it is proposed to purchase a suitable dredger

The present harbour facilities are not sufficient to provide shelter and berthing facilities for the increased traffic and growing needs of fish based industries and as such it is proposed to extend the fish landing facilities further by extending regular wharf beyond pontoon wharf by 150 m. and constructing 430 m. of wharf including reclamation of land opposite the present boat building yard. It is also proposed to provide an auction hall in this extended area.

It is also proposed to provide one dry dock for repairs facilities for the trawlers and mechanised fishing vessels as the existing dry dock of the port is not even capable of meeting the needs of the port flotilla and is not sufficiently deep for deep draft vessels.

It is estimated that the cost towards the above items will be of the order of Rs. 507 lakhs as detailed below :—

	Rs. in lakhs
1. Construction of break-water .. .. .. }	335.00
2. Mooring and navigational aids .. .. .. }	
3. Extending pontoon wharf 150 m	
4. Constructing 430 m. wharf and reclamation of plots including works opposite the present boat building yard including provision internal roads.	

STATEMENT II—*concld.*

Sr. No.	Item	Unit	1973-74	1978-79	1983-84	Remark
1	2	3	4	5	6	7
	(4) Requisites nylon (Progressive).	Lakh kgs.	5.90	8.90	15.90	
	(5) Transport facilities insulated/refrigerated trucks/vans (Progressive).	No.	50	100	200	
	Insulated/refrigerated carrier launches.	No.	25	35	40	
	Containers („)	No.	..	25	50	
	(6) Freezing and processing plants by co-operatives (Progressive).	No.	..	10	25	
	(7) Annual fishmeal production capacity (Progressive).	tonnes.	500	5500	15500	
	(8) Canning plants (Progressive).	No.	1	5	15	
7	**Co-operation**					
	(1) Membership of service Co-operative societies (Progressive)	No. in lakhs	15.50	18.00	22.80	
	(2) Co-operative credit / short and medium term.	Rs. in crores	75.00	115.00	150.00	
	Long term	Rs. in crores	90.00	168.00	200.00	
8	**Irrigation**					
	Minor Irrigation					
	(1) Potential (Progressive) tanks and bandharas	Lakh hectares	2.03	2.51	2.68	Ultimate potential is 2.68.
	Government tubewells	Lakh hectares	0.84	1.42	1.42	1. Rough estimate of ultimate potential from tubewells is 4.37. 2. These potentials will partly overlap with major and Medium irrigation potential.
	Private tubewells	Lakh hectares	0.97	3.08	3.08	
	Dug wells and pumping sets	Lakh hectares	16.28	Not projected	Not projected	
	Co-operative lift irrigation		0.31	Not projected	Not projected	
	(2) Schemes (Progressive)					
	Government tubewells	No.	1,756	2,356	2,356	
	Private tubewells	No.	1,200	3,800	3,800	
	New dug wells,	No. in lakhs	6.11	7.80	Not projected	
	pumping sets	„	2.10	4.17		
	Major and Medium Irrigation					
	(1) Potential (Progressive)	Lakh hectares	8.08	11.68	13.64	Excluding Narmada (ultimate 14.53).
	(2) Schemes (Progressive)	No.	53	104	119	

APPENDIX

Technical details of the works proposed to be undertaken at each fishing harbour in accordance with priority

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The port is situated in one of the best fishing grounds and is particularly noted for the best varieties of fish which are being exported in large quantities. The development works of the inner harbour area for landing fish catch have been carried out during the previous Plans, but the fishing operations have to be suspended during monsoon.

At present there are about 150 medium sized trawlers plying in the region off Saurashtra coast. It is contemplated that Veraval port will be the main base for working and shelter for trawlers operating in the region.

As the inner harbour area is not capable of providing any shelter for continuous working all through the year, it is proposed to convert the present fair weather port to an all weather port by constructing a break-water and extending the existing break-water This will make it possible to work in the port even during monsoon.

The existing break-water on western side shall have to be extended seawards beyond the 4 fathom line to act as a main berak-water against the winds and waves. It will also be necessary to provide the break-water on eastern side so as to ensure calm harbour area. It is proposed to have 183 metres wide entrance between these break-waters It is also necessary to have a turning circle of 366 metres diameter to a depth of 8 metres below L.L W S. so as to provide free turning area for modern deep draft fishing crafts. Since the break-water will extend up to sufficiently deep water, dredging involved for the turning circle and approach channel within the inner harbour area will also be necessary. The channel in the harbour area will be dredged to a level of 5.5 metres below L.L.W.S. It will also be necessary to provide mooring berths as well as navigational aids.

In order to dredge the turning bases, channels, alongside berths, etc , and to maintain the same every year, it is proposed to purchase a suitable dredger

The present harbour facilities are not sufficient to provide shelter and berthing facilities for the increased traffic and growing needs of fish based industries and as such it is proposed to extend the fish landing facilities further by extending regular wharf beyond pontoon wharf by 150 m. and constructing 430 m of wharf including reclamation of land opposite the present boat building yard. It is also proposed to provide an auction hall in this extended area

It is also proposed to provide one dry dock for repairs facilities for the trawlers and mechanised fishing vessels as the existing dry dock of the port is not even capable of meeting the needs of the port flotilla and is not sufficiently deep for deep draft vessels.

It is estimated that the cost towards the above items will be of the order of Rs. 507 lakhs as detailed below :—

	Rs. in lakhs
1. Construction of break-water	335.00 (items 1 and 2)
2. Mooring and navigational aids	
3. Extending pontoon wharf 150 m	3.83
4. Constructing 430 m. wharf and reclamation of plots including protection works opposite the present boat building yard including provision for internal roads.	20.24

		Rs. in lakhs
5.	Purchase of a dredger including hopper barges	75.00
6.	Construction of an auction hall 61 metres × 24 metres (air conditioned)..	15.00
7.	Construction of dry docks of size 87 metres × 37 metres	10.00
		459.07
	Add 10.35 % centage charges ..	47.46
	Total ..	506.53
	Say ..	507.00

Jaffrabad

The port of Jaffrabad is situated at the southern tip of Saurashtra coast on the Gulf of Cambay. The bay is surrounded by rocky hills, has a wide basin and the creek runs westwards. The township is very close to the port on the southern bank of the creek. It is proposed to develop all fishing activities on the northern shore of the creek. The development schemes of the Third and Fourth Five Year Plans have already been taken near the fish meal plant established by the State Fisheries Department. The catch is mainly Bombay Duck which is dried on the shore and shipped to Bombay.

The fishing prospects off the Jaffrabad coast are quite promising and it is now proposed further to develop the port in the Fifth and Sixth Plans. The proposals cover creation of a berthing basin with fish landing slopes, cold storage, ice plant, packing hall, godown and other ancillary amenities, etc. The estimated cost is detailed below :—

		Rs. in lakhs
1.	Landing facilities in the form of 174 metre straight wharf and 483 metre basin wharf including necessary dredging.	20.19
2.	Construction of internal roads including surfacing, etc.	1.50
3.	Provision of electrification, water supply, hydrants, etc.	1.50
4.	Office building, auction hall, store room, etc.	6.00
		29.19
	Add 10·35 % centage charges ..	3.02
	Total ..	32.21
	Say ..	32.0

Porbandar

Porbandar is an important intermediate port situated in the northern part of Saurashtra coast. The port is at present fair weather lighterage port and development of it as an all weather port is in progress. The commercial port activities have been gaining importance and considerable development activities have been taking place on the commercial side.

The port is also an important fishing port. Within the inner harbour upstream in the main creek beyond the dry dock, certain area is reserved for development of fisheries and fish landing activities are at present concentrated in this area. An ice plant has already been established in the vicinity of dry dock. The landing slope and jetty have been provided in the Third Five Year Plan.

APPENDIX—*contd.*

The present site, however, is not likely to be sufficient when the fishing activities expand during the Fifth and Sixth Five Year Plans. The FAO experts had also visualised this and have recommended development of further harbour facilities on the opposite bank of the creek. A bridge has already been constructed. Hence the harbour facilities on both banks will be inter-connected and will provide efficient and adequate harbour facilities for fisheries.

Looking to the growing demands of fish based industries, it is proposed to provide 580 m. of fish landing and berthing wharf, dredge the channel and alongside berths including reclamation of opposite bank of the creek and to provide repair facilities for trawlers and fishing vessels. A dry dock on the upstream side of present fishing wharf is proposed.

It is also necessary to provide berthing facilities for the deeper drafted trawlers and mechanised fishing vessels as the present trend is towards modern methods of fishing by large trawlers It is, therefore, proposed to provide two berths for deep drafted vessels for draft up to 5.5 metres in the lee side of break-water under construction.

The total estimated cost for all the items mentioned above is detailed below :

		Rs. in lakhs
1.	Fishing (fish landing) wharf 580 m. in the inner harbour ..	35.79
2.	Dredging and reclamation	17.31
3.	Transit godowns-2 Nos. 140 x 40	2 23
4.	Transit godowns-2 Nos. 200 x 40	3 19
5.	Auction hall	15.00
6.	Dry dock	10.00
7.	Trawler berths in the lee side of break-water ..	50.00
8.	Internal roads	0.69
		134.21
	Add 10 35 % centage charges ..	13.89
	Total ..	148 10
	Say ..	148.00

Umbergaon

Umbergaon is the southernmost port in Gujarat State and is famous for large and abundant area of fishing grounds. In the Third and Fourth Plans, two jetties have been constructed for the fishing vessels. However, the area behind the jetty is a sand-dune and is not approachable by motorised traffic. It is, therefore, necessary to make a level platform and provide an approach road up to the jetty. Similarly, amenities like water supply, electricity, etc., are also required to be provided.

The following works are therefore proposed to be undertaken :

		Rs in lakhs
1.	Levelling of plots	2.00
2.	Approach roads	2 00
3.	Electricity	0.50
4.	Water supply	0 50
5.	Dredging	3 00
6.	Navigational aids	0.50
		8.50
	Add 10 35 % centage charges ..	0.88
	Total ..	9.38
	Say ..	9.50

APPENDIX—*contd.*

Madhwad

The port of Madhwad, situated on latitude 20° 42′ north and longitude 70° 49′ east, is a minor sub-port under Veraval group of ports in Saurashtra peninsula in Amreli district of Gujarat State. It is connected with the nearest railway station Kodinar which is connected by asphalt road. This port being a minor port with no special landing facilities functions only in fair season, *i. e.*, from 15th September to 15th May. The main cargo of this port is fish. There are about 175 fishing crafts at this port and about 60 other country crafts come for fishing job from other parts of Gujarat.

The port is an unprotected harbour with a small creek inside. The tidal range is about 2 metres during spring and 1 metre during neaps. The depth in Madhwad bay is considerable while the creek portion is shallow and navigable only during high tides.

Till now, no amenities have been created for the improvement of Madhwad port. Hence the craft enter the creek only during high tides. The loading and unloading is also done on sandy beach which creates difficulties in further transportation of cargo to hinterland.

Also because of the sand movement in the creek, the creek gets shallower and thus causes hindrance to the fishing facilities.

In order, therefore, to provide proper landing facilities and also to reduce the accretion of sand in the creek, it is proposed to construct a landing wharf in the creek and stabilise the sand-dunes by sea wall and pitching and protect it by 3 groynes. Other ancillary amenities like water supply and electricity are also proposed to be provided. The estimated cost of the works is as under :

	Rs. in lakhs
1. Landing wharf	8.00
2. Groynes and protection works	10.00
3. Water supply	0.50
4. Electricity	1.00
5. Dredging	0.50
	20.00
Add 10.35 % centage charges ..	2.07
Total ..	22.07
Say ..	22.00

Jakhau

The port of Jakhau is situated on Godia creek which meets the Arabian Sea on the north-western coast of Kutch. The creek is very wide and deep with depths ranging from 3 to 4.5 metres at low waters. At the mouth there is a bar with depths of 1 to 1.25 metres.

The fishing area extends over a very wide range, and because of its proxomity to Pakistan, only local fishermen go out for fishing. It is proposed to provide a training school at the port for fishermen for deep water fishing. A jetty is proposed to be constructed during the current Plan period but ancillary facilities like water supply, electricity and drainage are still required to be provided. These works are included in the development programme of the fishing harbour of Jakhau. Water supply is one of the most important works and is required to be provided urgently as supply of fresh water comes from a distance of 14.5 kms. from the port. The fishermen and the staff at the Fisheries Training School experience great difficulties. Dependable quality and quantity of fresh water is available at a distance of about 20 kms. from the port. Hence a long pipe line will have to be provided for the purpose.

APPENDIX—*concld*

The estimated cost of the proposed works is detailed below :

		Rs. in lakhs
1.	Permanent water supply works including 20 kms pipeline ..	5.00
2.	Electricity	9 00
3.	Drainage	0.50
		14 50
	Add 10 35 % centage charges ..	1.50
	Total ..	16.00

Navabunder :

The port is situated on the mouth of river Machhundri and is famous for fishing activities in the area . Its geographical location is on the southern tip of Saurashtra peninsula and a large number of fishing crafts are operating from the port. The existing port facilities consist of a break-water on the rocky bluff jutting in the sea and a landing slope for unloading of fish.

The existing break-water is not enough to provide full shelter to the vessels berthed in the harbour area. There is a long felt need of providing an enclosed basin south of the existing break-water. This is proposed to be done by constructing a break-water on the rocky outcrop opposite Rakiya reef This will provide sheltered basin between the two break-waters and the fishing vessels operating at the port can beach in the sheltered harbour area. The south side of northern break-water can also be utilised for constructing landing slopes for fishing vessels. The proposal therefore is as follows :

		Rs. in lakhs
1.	Construction of break-water-213 metres (approx) at Rs. 2,638 per metre	56.00
2.	Dredging in rock in the basin .. , ..	20.00
3.	Providing landing slopes, 152 metres length	10.00
4.	Providing water supply arrangement	00 50
5.	Construction of internal roads	0.50
		87.00
	Add 10 35 % centage charges ..	9.00
	Total ..	96.00

Kolak :

Kolak is a fishing village classified as a minor port on the South Gujarat coast situated about 161 kms. north of Bombay. The village has good fishing activities, especially for Bombay duck and dara At present, fish landing facilities and other shore structures are being constructed. Navigation at the mouth of the river also presents difficulties due to the rocky outcrops where there is very shallow water during low waters. It is found necessary to break the rocky outcrops to deepen the approach channel near the mouth so as to avert accidents to crafts. This will also enable longer periods of working as the port is purely a tidal one at present The details of development schemes proposed are as under :

		Rs. in lakhs
1	Dredging and navigational aids	1.00
2.	Electricity and water supply	1.00
		2.00
	Add 10.35 % centage charges ..	0.20
	Total ..	2.20
	Say ..	2.50

Report of the Working Group on Agriculture, Irrigation, Animal Husbandry and Forests

Part - II

Irrigation and Flood Control

CHAPTER I

INTRODUCTION

1.1 Water

1 1.1 Water is one of the most important and basic resources in the world. Unlike other resources water is inexhaustible resource. Without water, no living things, plants or animals, an exist. It is required in abundance not only to quench our thirst and meet our domestic eeds but also, in vastly greater quantities, to produce and process the food we eat and the other aterials necessary for human welfare Conservation and utilisation of water resources are extricably bound up with the conservation and utilisation of the entire resource heritage of the region, and water resources development, affecting as it does most elements of economic activity, has some influence on nearby every aspect of the national economy.

1.1.2 Domestic needs of water are comparatively small and almost all the needs of rural areas can be met from underground resource or small surface tanks, However, demands of city areas and industrial demands would need consideration, but these are also comparatively small. Needs of agriculture are, by far, the largest.

1.1.3 India's population of 547 million (1971 census estimate) is expanding at the rate of 2 5 per cent per annum. Gross National Product (GNP) which was Rs 322 billions (Rs. 32,250 crores) at 1967-68 market prices, has been increasing at an average of 3 5 per cent per year during the last 10 years However, agriculture sector contributing nearly half of the Gross National Product, providing employment for about 70 per cent of the labour force and accounting for over half of the export earnings, grew only at 3 per cent per year during the same period The food imports totalling nearly 59 million tonnes during the decade ending 1969 (valued at Rs. 28,732 million) reflect the country's dependance on imports for meeting its food requirements. In addition, the country has to import cotton and other non-food agricultural produce. Inspite of sizeable domestic cotton production the country imports raw cotton worth about Rs 700 millions annually. Agricultural development, therefore, assumes great importance. With regard to foodgrains, Gujarat, in particular, is one of the most heavily deficit States in the country with an annual deficit of about 1.64 million tonnes valued at over Rs. 100 crores The over all production falls in a wide range from 19 to 20 lakh tonnes to around 40 lakh tonnes in an exceptionally good year of very favourable rainfall. Agricultural production in the country can be increased by two means; firstly, by bringing areas which are at present agriculturally unproductive under cultivation by corrective measures like reclamation and drainage wherever possible and secondly, by increasing the productivity of agriculture by either firming up or extending irrigation facilities and thereby providing farmers with assured and timely supply of water The perspective planning has to take into consideration potentialities of both these means

1.1.4 Nearly 70 per cent of Gujarat's population depends on agriculture. Agriculture is, therefore, the backbone of Gujarat's economy. The crops largely depend upon the vagaries of monsoon, with only 11.43 per cent of the cultivable land provided with dependable irrigation facilities The average yield of most of the crops are below the national average. To the farmer in Gujarat, a good monsoon augurs prosperity and a bad one near disaster. Agriculture is thus very largely a gamble. Irrigation water is the primary input necessary to increase the agricultural productivity in as much as it has the potential to increase the productivity more than three fold Moreover only if there is assured water supply, it becomes worth-while to incur the expenditure on other essential inputs, immproved seeds, fertilizers, etc.

.2 Land resource

The total reporting area of Gujarat for land utilisation purpose is 185.33 lakh hectares 57.95 lakh acres) Out of this, an area of 97.46 lakh hectares (240.83 lakh acres)

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1.2 Land resource

The total reporting area of Gujarat for land utilisation purpose is 185 33 lakh hectares (457.95 lakh acres) Out of this, an area of 97.46 lakh hectares (240.83 lakh acres)

i. e., over 52 per cent of the reporting area is cultivated. The cultivable area admeasures 123.78 lakh hectares (305.75 lakh acres) *i. e.* 66 per cent of the total reporting area. At present about 18.7 lakh hectares (46.21 lakh acres) of land are getting irrigation facilities of which 11.12 lakh hectares (27.49 lakh acres) are from surface wells.

1.3 Scarcity and droughts

1.3.1 The inadequacy and maldistribution (with respect to time) of rainfall in large parts of the State are responsible for recurrent droughts in one or the other part of the State. A map showing rainfall regions by extent of precipitation and reliability (related to irrigational needs) is appended herewith.

1.3.2 The districts in the North Gujarat *viz.* Banaksantha, Kutch and also parts of Mehsana, Surendranagar and Rajkot districts are characterised by arid and semi-arid climate and the annual rainfall in these areas varies from about 254 mm. to 454 mm. (10 .o 18 inches). Panchmahals, Sabarkantha and parts of Ahmedabad and Bhavnagar districts are also facing scarcity conditions in seven years out of ten.

1.3.3 The State Government has been spending large amount year after year to provide relief to the people and cattle in the scarcity afflicted areas. The details of the scarcity conditions in the past few years are given in the table below :—

Sr. No.	Year	Expenditure on relief works and relief measures (Rs. in crores)
1	1965-66	1.21
2	1966-67	5.99
3	1967-68	5.98
4	1968-69	6.64
5	1969-70	30.46

The importance and urgency of accelerating development of irrigation potential in the State hardly needs emphasis.

1.4 Water resources

1.4.1 The water resources of Gujarat State are extremely limited. These could be broadly classified as —

(a) Surface water and
(b) Ground water.

1.4.2 The surface waters are harnessed by constructing major, medium and minor irrigation schemes across the rivers and streams. Besides tanks and bandharas, minor irrigation also comprises construction of check dams, percolation tanks and lift irrigation schemes.

1.4.3 The construction of reservoir across the Tapi river is nearing completion while that across Mahi is in progress. Dharoi and Panam projects have been cleared by Planning Commission in July 1971. Preliminary works on the Dharoi storage project across the Sabarmati have been started and the work on the dam proper commenced from October 1971 and work on Panam from November 1971. Thus, having taken concrete steps to harness the major rivers no substantial water resources except Narmada would be left unharnessed. The remaining rivers are small and the rainfall in those basins is low. Gujarat has yet another formidable handicap.

The vast alluvial plains of Gujarat do not offer suitable dam sites to enable economic exploitation of these resources, meagre as they are. Most of the medium and minor feasible schemes have been completed and a few remaining are planned in the Fourth and subsequent Plans. The statistics of the existing irrigation potential under all the multipurpose, major, medium and minor irrigation works, the total potential planned to be created by the end of the Fourth and subsequent Plans and the ultimate potential considering all the feasible schemes other than Narmada are discussed in the subsequent paragraphs.

1.5 Available total surface water resources and irrigation potential

1.5 1 The available total surface water resources of Gujarat State excluding the Narmada basin and considering the different reliabilities for yields depending upon the average rainfall pattern in different regions have been estimated at 46 9 m.cu.m (38 maft.) as indicated below :—

Sr. No.	Region	Total catchment area of the basin in		Dependable annual yield in		Reliability
		sq kms.	(sq miles)	m. cu. m.	(maft)	
1	Gujarat region excluding Narmada	1,70,504	(65,832)	39 96	(32.40)	75 per cent
2	Saurashtra region .	6,086	(2,350)	4.55	(3 69)	60 per cent
3	Kutch region .	44,263	(17,090)	2 43	(1 97)	50 per cent
	Total .			46 94	(38 06)	
				Say, 46.9 m cu m (38 maft)		

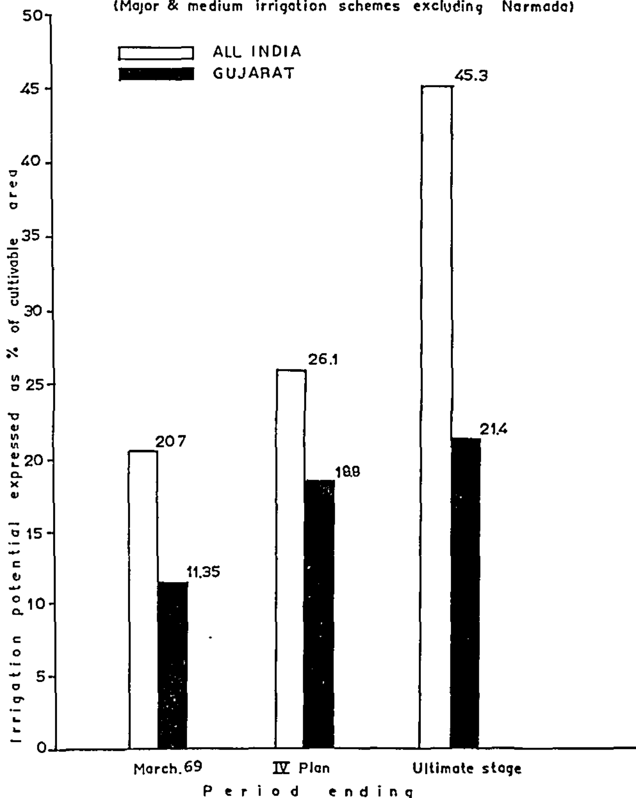
1.5.2 Out of the total surface water resources of 46.9 m.cu.m (38.00 maft.) excluding Narmada, nearly 53 per cent of the resources are from the inter-State rivers namely, Sabarmati, Mahi and Tapi. Only limited quantities of water can be available to Gujarat from these rivers. Lack of reservoir sites due to flat nature of the terrain and non-availability of suitable foundation have been the principal handicap in harnessing the available surface waters. Less than one-third *viz.* 15.37 m cu.m. (12.46 maft.) of the available supplies can be harnessed and put to irrigation use. On full harnessing, 17.20 lakh hectares (42.52 lakh acres) can be irrigated without Narmada in the ultimate stage.

1.6 Gujarat's position in India

1.6 1 The following table will reveal the extent to which Gujarat is behind the country in the field of irrigated agriculture :—

A. *Water resources*	India	Gujarat (excluding Narmada)
	Figures in milliard cu.m. (maft)	
1. Total surface water resources	1,675 (1,356)	47 (38)
2. Utilisable quantum of water resources	550 (450)	15.4 (12.46)
3. Percentage of (2) with reference to (1)	32.9 per cent	32.8 per cent
Water resources harnessed by March 1969	204 (166)	4 45 (3 61)
Percentage of (4) with reference to (2)	37.3 per cent	28.9 per cent
Water resources to be harnessed by end of Fourth Plan ..	255 (206 5)	8.91 (7.21)
Percentage of (6) with reference to (2)	46.3 per cent	57.8 per cent

IRRIGATION POTENTIAL OF GUJARAT V/S ALL INDIA EXPRESSED AS PERCENTAGE OF CULTIVABLE AREA



CHAPTER II

PERSPECTIVE PLANNING

2.1 Irrigation in Gujarat

2.1.1 The State has been giving great emphasis to the development of irrigation facilities in allocating outlays for the Five Year Plans. The Statements I and II show the outlays provided in the Plans for multipurpose, major and medium irrigation schemes and minor irrigation schemes

2.1.2 It will be seen from Statement I that the total outlay provided during the Second Plan expiring in 1961 was Rs. 35 42 crores, 10 schemes were completed and 48 were continuing; while in the Third Plan and three Annual Plans ending in 1968-69 an expenditure of Rs. 92.49 crores was incurred The Fourth Plan outlay of Rs. 110 crores is more than the cumulative total of First, Second and Third Plan outlay which was Rs 99 crores. This shows the importance Gujarat is giving to irrigation projects particularly in the Fourth Plan.

2.1.3 The per capita provision in the Fourth Plan of the State for irrigation is Rs. 68.75 (for multipurpose, major, medium and minor irrigation schemes), the highest in the country. The total outlay in multipurpose, major, medium and minor irrigation schemes in Fourth Plan is Rs. 141.5 crores including the provision of Rs 13 75 crores for the minor irrigation schemes in the agriculture sector.

2.1.4 Similarly with respect to potential created it will be seen that the cumulative potential at the end of Third Plan was 3 40 lakh hectares (8.42 lakh acres), while during the Fourth Plan itself 3.61 lakh hectares (8 92 lakh acres) is targetted mainly because of completion of Ukai storage reservoir, thus taking the cumulative potential to 8.17 lakh hectares (20 21 lakh acres) at the end of Fourth Plan. However, the percentage of irrigation potential will not go beyond 15.9 per cent at the end of the Fourth Plan, inspite of heavy outlays, as against 26 1 per cent expected for the country at that time. It is proposed to reach the target of 6.17 lakh hectares (15.25 lakh acres) of utilisation at the end of the Fourth Plan as against 1.73 lakh hectares (4 27 lakh acres) at the end of the Third Plan which is nearly four times Thus Gujarat is making rapid strides in creating larger potential and better utilisation of water resources A chart showing expenditure and irrigation potential created and proposed during Plan periods in Gujarat (excluding Narmada) is appended herewith

2.1.5 The principal data relating to agriculture and food production in different States of India during 1968-69 as prepared by the Central Government is given in Statement VI This shows the comparative figures of irrigation etc. of several States on the basis of different yardsticks. On the basis of the yardstick of irrigated area per thousand persons of population, Gujarat stands at number 9 in the list of 15 States, the order in descending scale being, Punjab with Haryana, Rajasthan, Andhra Pradesh, Uttar Pradesh, Orissa, Tamil Nadu, Jammu and Kashmir, Bihar, Gujarat, Mysore, Assam, West Bengal, Maharashtra, Madhya Pradesh and Kerala. On the basis of the yardstick of irrigation potential as percentage of cultivable area, Gujarat stands at number 13 in the list of 15 States, that is, third from bottom, the order in descending scale being Punjab including Haryana, Tamil Nadu, Jammu and Kashmir, Uttar Pradesh, Bihar, West Bengal, Andhra Pradesh, Assam, Orissa, Kerala, Rajasthan, Mysore, Gujarat, Maharashtra and Madhya Pradesh. In respect of the important criterion of food per capita per year in tonnes, Gujarat stands at number 15 amongst 16 States *i. e.* the second lowest.

2.1.6 In view of the poor status of Gujarat in the irrigation and food map of India it is necessary that the highest order of investment should be made in Fifth and Sixth Plans mainly to

ensure that all the harnessable water resources are fully exploited, and the ultimate potential and consequential utilisation to meet with the growing demand of increasing population of the State regarding food and fibre achieved as urgently as possible. Special emphasis has to be laid on the maximum provision for irrigation facilities to the relatively dry areas of the State such as Saurashtra, Kutch and North Gujarat, to ensure that the potential available there is harnessed by the end of the Fifth Plan itself.

2.1.7 Let us examine the provision in the Fourth Plan for multipurpose, major and medium schemes which form the major component of the irrigation outlay. The broad break up of Rs. 110 crores provided for these schemes in the Fourth Plan is given below :—

	(Rs. in crores)
(*i*) Spillover schemes	85.31
(*ii*) New schemes	14.79
(*iii*) Essential works including flood control	9.90
	110.00

2.1.8 All the spillover major and medium irrigation schemes, including Kakrapar and Mahi Stage I, are proposed to be completed during the Fourth Plan. In addition, Ukai head Works will be completed while the work on the Ukai canals would be in advanced stage of construction at the end of the Fourth Plan. The work on the Kadana, Sabarmati, and Panam irrigation projects will be in full swing. A start is proposed to be made on the Narmada project in the last two years of the Fourth Plan.

2.1.9 The total ultimate potential is roughly estimated at 14.52 lakh hectares (35.89 lakh acres) through multipurpose, major and medium irrigation schemes (excepting Narmada Project and Kadana High Level Canal). This would need 13.03 m. cu.m. (10.56 maft.) of surface waters. Against this, the total potential likely to be created at the end of the Fourth Plan by all the multipurpose, major and medium irrigation schemes will be 8.17 lakh hectares (20.21 lakh acres) and the corresponding surface water utilisation would be around 7.35 m.cu.m. (5.95 maft.)

2.1.10 In order to achieve self-sufficiency in food, extend facilities of irrigation to relatively dry areas of the State and reach the target of providing irrigation facilities to 50 per cent of the cultivated land in the State, top most priority will have to be given to the Narmada Project in the Fifth and subsequent Plans. It has been planned to create infra-structure and to undertake preliminary and pilot works to prepare a spring-board for undertaking the main dam and the canal works in a big way in the last two years of the Fourth Plan. Of course, the scope and the size of the Narmada Project are before the Narmada Water Disputes Tribunal appointed by the Government of India under the Inter-State Water Disputes Act, 1956. However, it may be reasonably hoped that the award of the tribunal would be available towards the end of 1972. There is a provision of Rs. 15 crores for Narmada Project during the Fourth Plan which, it is hoped, will be fully utilised before the expiry of the Fourth Plan. A note giving an outline of the Narmada Project and its salient features is given in Appendix-A.

2.1.11 Accordingly Perspective Plan has been prepared for the development of all possible irrigation facilities in Gujarat State through major, medium and minor schemes. Schemes have been grouped districtwise and the ultimate potential, regionwise, has been roughly assessed, (*vide* Appendix-B). Minor irrigation is dealt with in details in para 2.6.

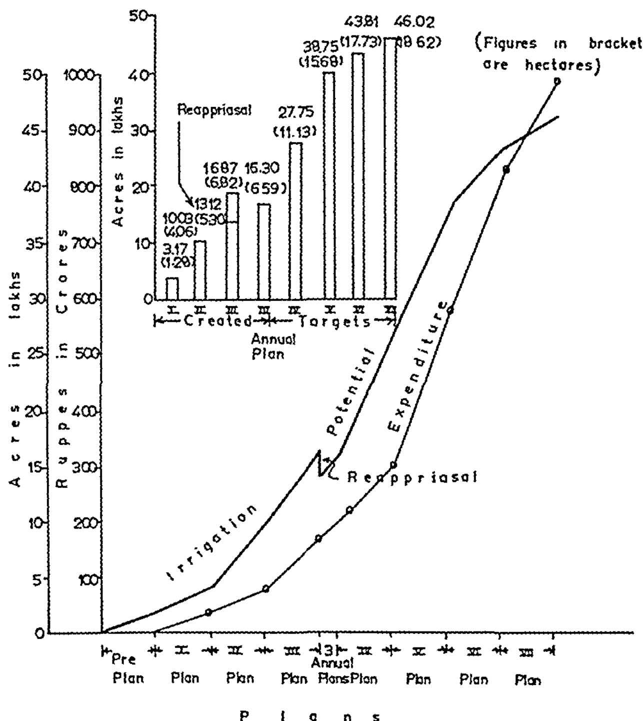
2.2 Basic objectives of perspective planning

2.2.1 The basic objective of the Perspective Plan for irrigation is to conserve the available surface water resources to the maximum possible extent as early as possible and use the supplies for irrigation of the largest area benefitting the largest number. New schemes are proposed to be selected taking into account various factors such as *interse* priority and balanced

EXPENDITURE AND IRRIGATION POTENTIAL CREATED AND PROPOSED DURING PLAN PERIODS IN GUJARAT.

(Excluding Normada)

Irrigation potential



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2.1.9 The total ultimate potential is roughly estimated at 14.52 lakh hectares (35.89 lakh acres) through multipurpose, major and medium irrigation schemes (excepting Narmada Project and Kadana High Level Canal). This would need 13.03 m. cu.m. (10.56 maft.) of surface waters. Against this, the total potential likely to be created at the end of the Fourth Plan by all the multipurpose, major and medium irrigation schemes will be 8.17 lakh hectares (20.21 lakh acres) and the corresponding surface water utilisation would be around 7.35 m.cu.m. (5.95 maft.)

2.1.10 In order to achieve self-sufficiency in food, extend facilities of irrigation to relatively dry areas of the State and reach the target of providing irrigation facilities to 50 per cent of the cultivated land in the State, top most priority will have to be given to the Narmada Project in the Fifth and subsequent Plans. It has been planned to create infra-structure and to undertake preliminary and pilot works to prepare a spring-board for undertaking the main dam and the canal works in a big way in the last two years of the Fourth Plan. Of course, the scope and the size of the Narmada Project are before the Narmada Water Disputes Tribunal appointed by the Government of India under the Inter-State Water Disputes Act, 1956. However, it may be reasonably hoped that the award of the tribunal would be available towards the end of 1972. There is a provision of Rs. 15 crores for Narmada Project during the Fourth Plan which, it is hoped, will be fully utilised before the expiry of the Fourth Plan. A note giving an outline of the Narmada Project and its salient features is given in Appendix-A.

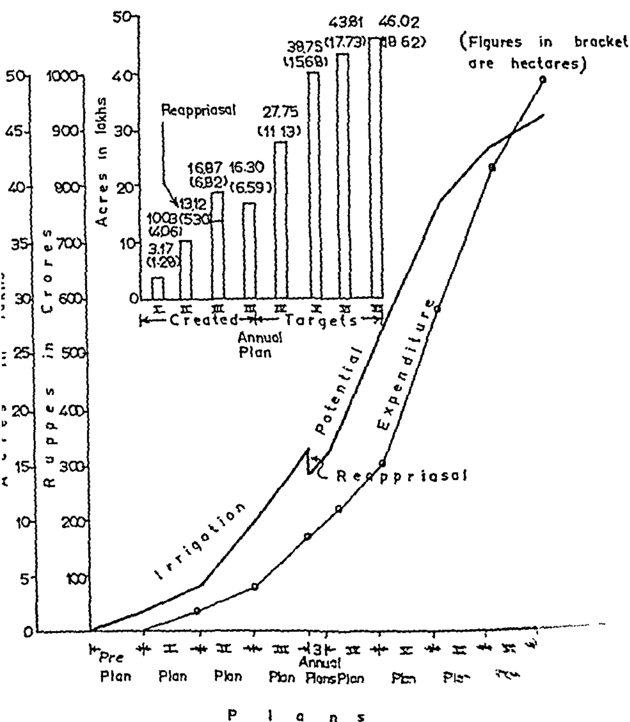
2.1.11 Accordingly Perspective Plan has been prepared for the development of all possible irrigation facilities in Gujarat State through major, medium and minor schemes. Schemes have been grouped districtwise and the ultimate potential, regionwise, has been roughly assessed, (*vide* Appendix-B). Minor irrigation is dealt with in details in para 2.6.

2.2 Basic objectives of perspective planning

2.2.1 The basic objective of the Perspective Plan for irrigation is to conserve the available surface water resources to the maximum possible extent as early as possible and use the supplies for irrigation of the largest area benefitting the largest number. New schemes are proposed to be selected taking into account various factors such as *interse* priority and balanced

EXPENDITURE AND IRRIGATION POTENTIAL CREATED AND PROPOSED DURING PLAN PERIODS IN GUJARAT.

(Excluding Narmada)



development of agriculture throughout the State. All spillover schemes of the Fourth Plan are planned to be completed before the end of the Fifth Plan, except Damanganga and Karjan, which will spillover into the Sixth Plan because these schemes are yet to be cleared by the Central Government. The factors to be weighed while selecting new schemes are as under :—

(*i*) The multipurpose, major and medium schemes envisaging storages to firm up and extend irrigation under existing weirs and inundation canals depending on the run of the river at present should be assigned first priority.

(*ii*) The schemes benefiting the border areas which are also relatively low rainfall areas *viz.* Kutch and Banaskantha, are given high priority. However, as only a few medium schemes are feasible in these areas, they will have to be developed by minor irrigation schemes.

(*iii*) Similarly, Saurashtra area which has low rainfall is given high priority.

(*iv*) The schemes benefiting chronically drought affected areas and economically backward areas are given priority. The people would get gainful employment on irrigated agriculture, thus resulting in considerable savings due to avoidance of gratuitous relief in future scarcities.

(*v*) Balanced distribution of irrigation benefits amongst Gujarat, Saurashtra and Kutch regions is yet another factor aimed at in planning.

2.2.2 All the feasible schemes in Saurashtra and Kutch have been included in the Fourth Plan on the basis of available information. However, due to absence of large rivers there, the irrigation development would be mainly under the minor irrigation schemes such as tanks, bandharas, check dams, dug wells, and tubewells wherever they are feasible.

2.2.3 So far as ground water resources are concerned, top priority needs to be given to assessment of ground water potential of the State. Only thereafter, programme for ground water exploitation can be taken up in a big way.

2.2.4 The new schemes to be taken up in the Fifth and Sixth Plans will be completed either during the Fifth Plan or by the end of the Sixth Plan. Only those schemes located in areas of higher rainfall and those which are dependent on the Narmada canal and a few schemes which are difficult ones will spillover into the Sixth Plan and beyond. Of course, Narmada scheme will be given due priority and this will be the only major and multipurpose scheme continuing during Fifth, Sixth and Seventh Plans and will take about 25 years to complete after its commencement in a big way. The scope and size of the Narmada Project are however to be determined by the Narmada Water Disputes Tribunal.

2.2.5 Outlays are accordingly provided as follows :—

(Rs in crores)

	Fourth Plan	Fifth Plan	Sixth Plan	Seventh Plan
1 Multipurpose, major and medium irrigation schemes (excluding flood control)	103 00	201.00	226 41	169.77
2 Minor irrigation, tanks and bandharas, Government tubewells etc (including Rural Works Programme)	22 94	42.20	11 80	..

2.2.6 It will be noted that a substantially higher outlay of Rs. 201 crores is proposed in the Fifth Plan as against Rs. 103 crores in the Fourth Plan with respect to multipurpose, major and medium irrigation schemes to achieve the objectives outlined above. While the outlay in the Fifth Plan can be proposed at Rs. 201 crores, nearly double of the Fourth Plan outlay, it would

not be possible to do so in the Sixth Plan and subsequent Plans, due to the limited irrigation potential till desalinized water could be available at economical cost for use on irrigation. The above planning ensures completion of practically all the feasible schemes in the State, excepting Narmada, substantially by the end of the Fifth Plan, and the few remaining schemes in the Sixth Plan. Workable planning indicates that there would be saturation with regard to the development outlays in the Sixth Plan and the expenditure would taper off in the Seventh and subsequent Plans as most of the schemes will be completed by the end of the Fifth Plan and only a few, in addition to Narmada, will spillover in the Sixth Plan. The planning also takes into consideration completion of the Fourth Plan spillover schemes to the extent of about 87 per cent in the Fifth Plan with a small carry over of about 13 per cent into the Sixth Plan.

2.2.7 The broad details of the financial as well as physical planning of the Fifth, Sixth and Seventh Plan proposals spread over a period of 15 years starting from 1974 are given below :—

The financial programme and the physical targets for the above Plans have been abstracted in Statement VII and Statement VIII. As against the outlay of Rs. 103 crores in the Fourth Plan for multipurpose, major and medium schemes, outlays of the order of Rs. 201 crores and Rs. 226 crores are proposed for the Fifth and Sixth Plans. The details of new schemes envisaged to be taken up in the Fifth and subsequent Plans are furnished in Statements X, XI, XII and XIII. It will be noted that the schemes in Saurashtra, Kutch and North Gujarat are expected to be completed in the Fifth Plan.

2.2.8 The Government of India has initiated a programme known as Rural Works Programme for the chronically drought affected areas, which is a centrally sponsored scheme and covers minor irrigation schemes excluding tubewells. Minor irrigation works play an important role under this programme. There is a provision of Rs. 5.22 crores for this programme outside the Fourth Plan. The programme is expected to be completed by 1973-74.

Multipurpose, Major and Medium Irrigation Schemes

2.3 FIFTH PLAN

(a) Financial Outlay

(i) Continuing Schemes

It will be seen from Statement VII that the outlay for the Fifth Plan has been worked out at Rs. 216 crores. This is approximately twice the Fourth Plan outlay. Rs. 87.22 crores *i. e.* about 40 per cent of the total outlay, have been provided for completing most of the continuing schemes of the Fourth Plan. Tentatively, a provision of Rs. 95 crores has been indicated for the Narmada Project, depending upon the scope and size of Narmada Project and the share of Gujarat Government therein. This provision would be reviewed soon after the tribunal gives its decision and, if necessary, the provision will be suitably increased. This should not be difficult by making small adjustments within the irrigation sector and other sectors.

In some of the projects like Dharoi, Panam and Damanganga, the total cost of the projects will include some share from non-Government bodies like the Ahmedabad Municipal Corporation, Gujarat Industrial Development Corporation, etc. for meeting with their water supply demands. As such, the outlays have been worked out for the State Budget only after deducting the likely shares of such bodies.

(ii) New Schemes

Twelve schemes covering all the regions of the State estimated to cost Rs. 94.74 crores have been proposed to be started in the Fifth Plan and an outlay of Rs. 9.85 crores has been earmarked for these schemes. Three schemes namely (*i*) Mitti in Kutch, (*ii*) Godhatad in

Kutch and (*iii*) Wankleshwar Bhay in Panchmahals, will be completed during this Plan and the remaining nine will spillover into the Sixth Plan. The low outlay is on account of the following considerations :—

(*i*) intention to complete a major part of the spillover schemes of the Fourth Plan during Fifth Plan period ;

(*ii*) to limit the size of the Plan to a reasonable and workable outlay ; and

(*iii*) to give momentum to the Narmada Project, the only multipurpose project that will be remaining.

(b) Physical Targets

In a nutshell, the physical targets regarding irrigation potential to be created as well as utilisation at the end of the Fifth Plan (excluding minor irrigation) against the proposed outlay is given in the table below :—

		Fourth Plan	Fifth Plan	Cumulative at the end of Fifth Plan	Sixth Plan
1	Outlays (Rupees in crores)	103.00	301.00	431.16	226.41
2	Additional irrigation potential in lakh hectares (lakh acres)	3.61 (8.92)	3.50 (8.65)	11.68 (28.86)	1.85 (4.82) 6.00 (14.82) *
3	Utilisation without Narmada in m.cu. m.(maft.)	3.15 (2.56)	1.63 (1.60)	10.49 (8.50)	1.74 (1.41) 5.38 (4.36) *

*Assumed achievements with Narmada

2.4 SIXTH PLAN

(a) Financial Outlay

(i) Continuing Schemes

As indicated earlier, a very small portion of the Fourth Plan spillover schemes will appear in this Plan, namely Rs. 14.00 crores. The schemes coming under this category are Karjan and Damanganga which are proposed to be completed during the Sixth Plan.

In respect of schemes proposed to be started in the Fifth Plan at an estimated cost of Rs. 94.74 crores, an outlay of Rs. 43.41 crores will spillover in the Sixth Plan. Out of the 9 schemes which will spill into the Sixth Plan from 12 commenced in the Fifth Plan, 3 schemes, *viz.*, Heran, Sukhi and Orsang will spillover into Seventh Plan and will be completed during that Plan. Only the Kadana High Level Canal will spillover further as the benefits of the scheme are dependant on the Narmada Project. As such an amount of Rs. 13.61 crores for the Kadana High Level Canal will be carried forward beyond the Seventh Plan.

(ii) New Schemes

In this Plan all the remaining schemes thought of in achieving the ultimate potential of 14.52 lakh hectares (35.89 lakh acres) estimated to cost Rs. 14.54 crores (excluding Narmada) are proposed to be undertaken (Statement XII). An outlay of Rs. 6.0 crores has been proposed for these schemes in this Plan and the balance in the Seventh Plan.

It is hoped that by this time the work on Narmada would be in full swing and, therefore, a provision of Rs. 130.00 crores is proposed during this Plan for the Narmada Project.

Thus the total outlay for the Sixth Plan works out to Rs. 243.41 crores, taking into consideration all the above provisions and outlay on reclamation, flood control and miscellaneous essential schemes like research, workshop, etc. This works out to an increse of about 12 per cent over the Fifth Plan outlay.

(b) Physical Targets

The table below gives in a nutshell the physical targets regarding irrigation potential to be created as well as utilisation at the end of the Sixth Plan (excluding minor irrigation) against the proposed outlay.

	Fifth	Sixth	Cumulative at the end of Sixth Plan	Seventh
1. Outlay (Rs. in crores)	201.00	226.41	677.69	169.77
2. Irrigation potential in lakh hectares .. .. (lakh acres)	3.50 (8.65)	1.95 (4.82) 6.00 (14.82) *	13.63 (33.68) 17.67 (43.68) *	0.89 (2.21) 13.28 (32.81) *
3. Utilisation without Narmada in m. cu. m. (maft.) ..	1.85 (1.50)	1.74 (1.42) 5.38 (4.36) *	12.22 (9.91) 15.65 (12.65) *	0.80 (0.65) 10.60 (8.60) *

*Assumed achievements with Narmada.

2.5 SEVENTH PLAN

(a) Financial Planning

A total outlay of Rs. 169.77 crores has been proposed in the Seventh Plan. All the new schemes to be taken up in the Fifth and Sixth Plans are proposed to be completed during the Plan period excepting the Kadana High Level Canal. No new scheme would be left for the Plan as can be envisaged at present. The provisions corresponding to the schemes of Fifth and Sixth Plans would be Rs. 27.88 crores and Rs. 8.84 crores. The outlay of Rs. 169.77 crores has been provided in the Seventh Plan which is inclusive of Rs. 20.00 crores for the Kadana High Level Canal.

For the Narmada Project, a provision of Rs. 115.00 crores has been made during the Plan.

(b) Physical Targets

Physical targets regarding irrigation potential to be created as well as utilisation at the end of Seventh Plan (excluding minor irrigation) against the proposed outlay is given in a nutshell in the table below :—

	Sixth Plan		Seventh Plan		Ultimate (Cumulative)	
1. Outlay (Rs. in crores) ..	226.41		169.77		847.36	
2. Irrigation potential in lakh hectares (lakh acres) ..	1.95 [6.00	(4.82) (14.82)	0.89 13.26	(2.21) (32.81)	14.52 26.91	(35.89) (66.49)]*
3. Utilisation without Narmada in m. cu. m. (maft.)	1.74 [5.38	(1.42) (4.36)	0.80 10.60	(0.65) (8.59)	13.03 24.13	(10.56) (19.56)]*

[ ] *assumed achievements with Narmada.

During this Plan the potential likely to be created by Narmada Project is estimated at 8·9 lakh hectares (22.00 lakh acres) and 2·023 lakhs hectares (5.00 lakh acres) from Kadana High Level Canal. Thus at the end of the Seventh Plan the total potential including Narmada

will be 29.5 lakh hectares (72.89 lakh acres) (Statement VIII) with a net potential of 26.91 lakh hectares (66.49 lakh acres) considering the deduction of 2.59 lakh hectares (6.40 lakh acres) on account of overlap of Mahi Stage command. This will correspond to surface water utilisation of 24.13 m. cu. m. (19.56 maft.).

As can be seen from the above, the ultimate potential is planned to be achieved by the end of the Seventh Plan when all the schemes in progress and likely to be taken up in the future plans, as can be envisaged at present, would be completed. The work on the multi-purpose project of the Narmada and associated projects like Kadana High Level Canal will be getting considerable attention from the Fifth Plan onwards. Multipurpose, Major and Medium Irrigation works in operation, under construction in Fourth Plan and contemplated in future Plans are shown in the Map.

MINOR IRRIGATION

2.6 Tanks and Bandharas, Check Dams, Percolation Tanks, Drains, Lift Irrigation, Dug, and Tubewells.

2.6.1 Minor irrigation works comprise (*i*) tanks and bandharas (*ii*) check dams and percolation tanks (*iii*) drains (*iv*) lift irrigation schemes (*v*) dug wells (private) and (*vi*) tubewells (Government and Private). The ceiling for individual minor irrigation scheme has recently (since 1st April 1970) been raised to Rs 25 lakhs (Rs. 30 lakhs for hilly areas). These works contribute significantly to total irrigation facilities in India, and particularly in Gujarat. They are of simpler nature and their planning and execution are comparatively quicker. Investigation and sanctioning of schemes can be finalised in shorter time and at the State level only. These schemes have greater adaptibility even in difficult locations where bigger schemes are not possible. Thus balanced and equitable development of various regions is ensured resulting in appreciable utilisation of water from even comparatively smaller streams. Again, minor irrigation works are employment oriented and they are found very handy as scarcity relief works.

2.6.2 Check dams are small works constructed for temporarily storing post monsoon flow in small streams and thereby allowing water to percolate deep into the ground. They help in maintaining ground water table on which dug wells depend. These works contribute towards indirect benefits of conserving water, though they do not create any direct potential. In arid areas of the state, like Saurashtra, a series of check dams constructed on a small river would go a long way in conserving the meagre water resource available in such areas.

2.6.3 Percolation tanks are likewise small earthen bunds which conserve the rain water during the monsoon and help raising the water level in the dug wells on the periphery and especially on its downstream side by percolation through pervious strata. No canals are taken out from such tanks and therefore there is no direct irrigation. Some irrigation on the periphery is done by lifting the water.

2.6.4 Recently lift irrigation schemes which are outside the co-operative sector are also included in the activities of the Public Works Department in the field of minor irrigation. Such schemes are generally constructed on banks of rivers and nallas. Therefore, though, they are lift irrigation schemes, the potential tapped will be, by and large, the surface water potential and not the ground water potential.

2.6.5 In the field of minor irrigation, irrigation facilities were available to 0.51 lakh hectares (1.27 lakh acres) at the beginning of the First Plan. During the period of three Five Year Plans and three annual Plans, 1026 minor irrigation schemes were completed creating an additional irrigation potential of 1.05 lakh hectares (2.60 lakh acres). Against the total cumulative expenditure of about Rs. 11 crores incurred during First, Second and Third Plans, the Fourth Plan provides an outlay of Rs. 12.22 crores to create an additional potential of 0.47 lakh hectares (1.16 lakh acres). The provision for schemes like 'Grants of subsidy to weaker sections for construction of new wells (Harijan)' and purchasing debentures of Land Development Bank and Agriculture Refinance Corporation etc. are made by Agriculture sector which deals with these schemes.

2.6.6 A potential of 2,12,095 hectares (5,24,100 acres) is expected to be created at the cost of Rs. 33.82 crores inclusive of Rural Works Programme by the end of the Fourth Plan, the details of which are given in Statements II and XIV.

2.6.7 A study was made in the Central Designs Organisation about the total ultimate potential of water resources in Gujarat State. This indicates that in the field of minor irrigation excluding tubewells, the ultimate potential has been assessed at 2.68 lakh hectares (6.63 lakh acres) as against 2.12 lakh hectares (5.24 lakh acres) expected to be created by the end of the Fourth Plan. Though it is highly desirable to complete all minor irrigation schemes before the end of the Fifth Plan, it is not possible to complete tanks and bandharas before the Fifth Plan for the reasons mentioned in para 2.6.9 below. Every effort should however, be made to step up the outlays proposed now, looking to the experience gained in the middle of the Fifth Plan period.

2.6.8 It is proposed to create the estimated potential at the end of the Sixth Plan. For convenience and ready reference, the planning has been done regionwise. During the future Plans *i. e.* during the Fifth and Sixth Plans, it is proposed to spend Rs. 35.00 crores for construction activities and Rs. 1.00 crore for investigation work in the field of minor irrigation. Thus an additional potential of 0.57 lakh hectares (1,395 lakh acres) would be created during the Fifth and Sixth Plans - 39,174 hectares (96,800 acres) and 17,280 hectares (42,700 acres) respectively in the two Plans.

2.6.9 After the end of the Fourth Plan, there would be scope of M. I. Schemes costing Rs. 36.00 crores only (for tanks and bandharas), so it is proposed to provide Rs. 24.20 crores during the Fifth Five Year Plan and the balance of Rs. 11.80 crores during the Sixth Plan. Though our objective should be to fully exploit the minor irrigation potential as quickly as possible, preferably by the end of the Fifth Plan, it is felt that it is not possible to spend the entire amount of Rs. 36.00 crores in the Fifth Plan. However, as against Rs. 12.22 crores in the Fourth Plan, it is proposed to provide double the amount namely Rs. 24.20 crores in the Fifth Plan. It is not possible to provide more in the Fifth Plan on the realistic basis for the following reasons :—

(1) The most important reason is that the schemes now remaining will not only be more costly but also be technically more difficult, as all better schemes have been taken up earlier. The schemes now remaining will take more time in investigation and in the preparation of plans and estimates also.

(2) Generally the minor irrigation schemes are being executed through the contractors on agency basis. The present experience is that the tenders of M. I. Schemes come very high as there is very poor competition. After inviting tenders twice or thrice, only two to three contractors come forward and that too at a very high rate and with a number of un-acceptable conditions. Labour problem is also very acute. In working season, contractors hardly get labourers even at high rates as the rural people are busy with agricultural operations.

2.6.10 Taking into consideration the spillover outlay in the beginning of the Fourth Plan the districtwise status of the minor irrigation schemes as in August 1971 is given in Statement XVIII. From this, it would be seen that irrigation schemes now remaining to be investigated are 690 costing about Rs. 22.31 crores. All these schemes may not be technically feasible, about 33 per cent schemes costing approximately Rs. 7.50 crores may turn out to be infeasible.

2.6.11 Of the minor irrigation schemes only tanks, bandharas and lift irrigation works contribute towards direct benefits which can be measured as potential created. The other works such as check dams, percolation tanks, detention tanks and drains give only indirect benefits, which do not enter into the statistical figures of physical achievement. Cost criteria have been laid down for tank and bandhara work. These criteria differ from district to district and from taluka to taluka. For the purpose of planning, an average cost criterion has to be adopted for working out the physical targets. Such a criterion has not only to take into account the varia-

agencies with the result that the withdrawal from the ground water reservoirs is more than the recharge and a danger of permanent depletion exists in some parts of the State. Certain standards regarding minimum spacing between two tubewells and the number of tubewells per sq. km. of the area have been laid down by executive instructions which are applicable in case of those private agencies only who apply for loans under A. R. C. Programme from the Land Development Bank. For other agencies who do not require any Government help the State has no control whatsoever. It is therefore, necessary to have some regulation in constructing, operating and maintaining tubewells. The State Government has already realised the importance of this and prepared a draft bill for the purpose of regulating construction and maintenance of tubewells, artesian wells and bore wells.

2.7.2 In respect of tubewells our objective should be to exploit the potential already assessed by the end of the Fifth Plan and also to electrify all the tubewells. If a few remain to be electrified in the Fifth Plan the same may be electrified in the beginning of the Sixth Plan.

2.7.3 In Gujarat, ground water investigations are carried out by three agencies *viz.*, Geological Survey of India, Exploratory Tubewells Organisation of Government of India (now Central Ground Water Board) and the Soil Survey Officer,Baroda (now Geo-hydrologist). These agencies have carried out investigation of 16,822 sq. kms. (6,495 sq. miles) upto 31st March 1971 and are still carrying out necessary further investigations. Ground water assessment studies in the districts of Mehsana and Banaskantha are also to be carried out under the United Nations Development Programme. This scheme includes :—

(*i*) Investigation for deeper sweet water bearing aquifers in the central part of Mehsana district where the present aquifers are being overdrawn.

(*ii*) Investigation of deeper sweet water bearing aquifers in the western portion of Mehsana and Banaskantha where the shallower acquifers are saline.

(*iii*) Estimation of ground water recharge by radio tracer studies.

(*iv*) Investigation for zones of artificial recharge.

(*v*) Construction of an electric analog model of the area for ground water management.

This work, to be started, now will be completed in 3 years, say by 1974.

2.7.4 The Government of India has undertaken a project for the comprehensive survey of the water resources of Narmada Basin including ground water. The project will mainly cover alluvial tracts of the Narmada basin in the States of Madhya Pradesh and Gujarat. Under this project, 3885 sq. kms. (1500 sq. miles) in Gujarat will be taken up for hydrological tests coupled with test drilling and establishment of the permanent net work of stations for long range ground water studies to be undertaken by the Central Ground Water Board, Government of India. One branch office of the project is being opened at Baroda.

2.7.5 Total area of the Gujarat State is 1,87,101 sq. kms. (72,240 sq. miles) which can be broadly divided into four groups for the purpose of exploration as under :—

	Approximate area in sq. kms. (sq. miles)
(*i*) Alluvial tract between northern boundary of the State and river Kaveri with sizeable potential for ground water development.	38,850 (15,000)
(*ii*) Hilly tract in the east consisting of quartzites, phylites, and schiests and a few patches of sand stone to north of Narmada river.	44,030 (17,000)
(*iii*) Semi-arid tract of Kutch	44,030 (17,000)
(*iv*) Peninsular region of Saurashtra consisting of Basaltic trap with a coastal fringe of recent alluvium with poor possibility of major water bearing aquifers in the trap area.	59,570 (23,000)
Total ..	1,86,480 (72,000)

2.7.6 It is proposed to complete exploration of 26,482 sq. kms. (10,225 sq. miles) at the end of the Fourth Plan. The remaining area to be explored will be about 1,69,580 sq. kms. (62,000 sq. miles) Looking to the past performance the work of completing the exploration of the remaining entire potential during the Fifth Plan appears tremendous. However, by expanding the organisation and equipment considerably, it is proposed to complete this entire remaining potential by the end of the Fifth Plan. A total provision of Rs. 8 00 crores is made for the exploration at the rate of about Rs. 500 per sq. km. (Rs. 1,300 per sq. mile) in Fifth Plan as against the total proposed provision of Rs. 18.00 crores in the Fifth Plan.

2.7.7 The Gujarat State Co-operative Land Development Bank and Agriculture Refinance Corporation have a large loan programme for construction of wells, tubewells and installation of pumpsets for which the State Directorate of Groundwater Investigation gives the necessary technical clearance. Due to the nationalisation of Commercial Banks, the required loan is available to the agriculturists on the strength of the water availability certificate issued by the Public Works Department. Such certificates are being issued depending on the results of exploration work.

2.7.8 In order to enable the financing institutions to accelarate their programme it is necessary that the Directorate needs to be strengthened considerably to complete the exploration quickly and for early technical clearance and for carrying out additional ground water resources development work for Mahi-Kadana Project and the Gujarat Agriculture Credit Project.

2.7.9 Under the Rural Works Programme, centrally sponsored, it was planned to have 129 tubewells in the selected drought affected talukas of ten districts during the Fourth Five Year Plan. But as the ground water potential of some of these districts does not permit construction of tubewells as proposed, the provision is likely to be reduced to 100 tubewells during the Fourth Plan. Detailed districtwise breakup is given in Statement XVII.

2.7.10 The exact total potential to be exploited in terms of number of tubewells still remains to be assessed. But on preliminary assessment it is expected to be about 4,800 tubewells at the beginning of the Fourth Five Year Plan. It is proposed to complete all these tubewells by the end of the Fifth Plan. Accordingly the Planwise proposals are as under :—

	Number of Wells		
	Government Sector	A. R. C. Programme	Total
Fourth Plan	300 100 (RWP)*	1,200	1,600
Fifth Plan	600	2,600	3,200
Total ..	1,000	3,800	4,800

*Rural Works Programme

(The total number of private tubewells is 1073 up to 31st March 1969).

2.7.11 On completion of further exploration during the Fourth Plan and Fifth Plan periods, if additional potential of ground water could be assessed, that would be proposed for full exploitation in the Sixth Plan Agricultural Refinance Corporation Programme will be implemented by the Land Development Bank by advancing loans to individual farmers and as such no provision for the same has been made in the Plan in the Government sector but given separately. Provision of Rs. 10.00 crores is, however, made for construction of 600 tubewells in the Fifth Plan in the Government sector. The Land Development Bank will require an investment of about Rs. 30 40 crores for 3,800 tubewells at the rate of Rs. 0 80 lakh per tubewell in Fourth and Fifth Plans.

Electrification of Tubewells

2.7.12 The economy and efficiency of tubewells greatly depend on their electrification and hence it is the decided policy of Government to electrify all successful tubewells as quickly as possible. The work of electrification is being carried out by Gujarat Electricity Board for which necessary loan is advanced to it through provision made in the Rural Electrification Programme under the Power Sector. At the end of the Fourth Plan, 955 Government tubewells are expected to be electrified. The electrification of Government tubewells in Fifth and Sixth Plan periods will be 990 and 100 as indicated in Statement XVI and the funds required would be Rs. 3.96 crores and Rs. 0.40 crores respectively.

For electrification of private tubewells, under Land Development Bank and Agriculture Refinance Corporation Schemes the funds required would be Rs. 3.00 crores and Rs. 7.00 crores in Fourth and Fifth Plans.

Physical Targets

2.7.13 The table below gives in a nutshell, the outlay proposed, additional irrigation potential to be created and utilisation targetted during the Fifth and Sixth Plans :—

	Fourth Plan	Fifth Plan	Cumulative
1. Outlay (Rs. in crores)	5.50	18.00	33.47
2. Irrigation Potential in lakh hectares	0.21	0.49	1.33
(lakh acres)	(0.52)	(1.20)	(3.28)
3. Utilisation in lakh hectares ..	0.13	0.30	0.84
(lakh acres) ..	(0.33)	(0.75)	(2.08)

General

2.7.14 As far as exploration is concerned, it would be over at the end of the Fifth Plan. Similarly, construction of tubewells for the entire State also should be over by the end of the Fifth Plan. The only work that would spillover into the Sixth Plan would be the electrification of 100 tubewells that would be constructed in the last year of the Fifth Plan, and the construction of new tubewells against the additional potential that may be established over the present assessment as a result of detailed exploration that may be continued in the Fifth Plan. Statement XV gives the perspective planning for the Fifth and Sixth Plan periods (1974 to 1984).

2.8 Dug wells

2.8.1 A very large number of conventional (dug) wells have been constructed in the State to tap the ground water resources. Out of the meagre irrigation facilities so far created in the State, about 2/3 is due to such wells. It is an acknowledged fact that lift irrigation is 3 to 4 times more costly than surface irrigation, still the industrious farmers of Gujarat have to adopt such costly mode of irrigation to earn their livelihood in the absence of flow irrigation. For efficiency and economic working of irrigation on the wells it is essential that pumping sets run by diesel engines, and wherever possible on electricity, should be installed as early as possible. Even after taking into consideration the Narmada Project, the ultimate percentage of irrigation in the State would be about 50 with respect to the cultivable area in the State. Hence, for the remaining area dug wells and tubewells will be the principal source of irrigation. Even in the command areas of irrigation projects they have their role to play. The total number of wells in Gujarat is estimated to be 6,11,000 by the end of Fourth Plan while the total number of pumpsets would be around 2,10,000.

2.8.2 It is necessary to undertake an ambitious programme of dug wells in the State. This will require close co-ordination between the Ground Water Directorate which gives clearance certificate for such wells and the Agriculture Department as well as the Land Development Bank which advances loans for the construction of the wells (including tubewells) and installation of pumpsets thereon. The Reserve Bank and the Agriculture Refinance Corporation have

imposed the condition that prior technical clearance from the Ground Water Directora essential before loans could be advanced for wells, tubewells and installation of pumpsets. I therefore, essential that the Ground Water Directorate should investigate all the remaining a in the State expeditiously so that no difficulty is experienced in giving clearance certificate wh the ground water potential is established. Otherwise, farmers could be advised not construct wells and thereby waste national resources where there is no possibility of securi even meagre quantity of good water.

2.8.3 It is also essential that wherever recuperation in the wells is below expectation, methods of recharging are investigated. At present no scheme of recharging is under operation in the State. It is recommended that Government undertakes schemes of recharging in selected areas on an experimental basis, so that sufficient experience may be gained about the methods of recharging, their economics etc., to enable formulation of future policy on a realistic basis.

2.8.4 Equally important are the statistical data regarding the number of wells constructed districtwise, number of pumping sets installed thereon, the scope for new wells and the irrigation achieved by the wells. It is, therefore, recommended that the Agriculture Department should open a survey, statistical and research cell for this purpose and maintain an up-to-date and reliable record of all the wells (and tubewells) in the State and the scope for new wells in different areas of the State. The cell should feed back the data regarding the unsuccessful wells to the Ground Water Directorate which can analyse the results to shape their future policy. It is recommended that a bench mark survey should be undertaken immediately to know the present status of dug wells in the State and thereafter once in every two years assessment should be made regarding the number of new wells dug and the wells that have become derelict, the pumpsets installed, electrified or otherwise and the actual area irrigated, so that based on such reliable data, future policy can be formulated with a view to achieving the ultimate potential in the Sixth Plan as far as possible.

2.8.5 It is essential that installation of more pumping sets should be done in the commanded areas of flow irrigation schemes, where the sub-soil water table is high, especially with re-generation of flow. In Ukai command pumping sets will lower the water table and hence their installation should be encouraged. Even in the areas under perennial irrigation pumping sets should be very useful for growing vegetables and for quicker drainage.

2.8.6 At present Government is charging full water rates for irrigation from wells within 30 metres (100 ft.) of canals. It is felt that the question of reduction of water rates in such cases should be considered looking to the need to encourage such wells from the drainage point of view. It is felt that, in view of the high cost of lift, there is no likelihood of abuse of relaxation in water rates in such cases.

2.8.7 For deepening of wells by blasting, the Agriculture Department is having an organisation, but the subsidy scheme is stopped some years ago. The damand for blasting unit has fallen due to competition from private agencies where the standard of work is low. In order to maintain the standard, it is felt that some rethinking should be done on the nature of the Government schemes to evoke the agriculturists' interest in securing the assistance of the Government blasting unit for deepening of wells such as by way of reduction in the rate of hire for such unit.

2.8.8 Gujarat has also tried the scheme of community wells during the last scarcity, at the rate of two wells in each taluka. Such a scheme would be a boon to the people in the backward areas where the loans from the Land Development Bank will not be available on account of the heavy indebtedness of the farmers. It is recommended that Government consider the scheme of community wells in selected backward areas of the State by making the investments from Government funds in the beginning and recovering them from the beneficiaries, who should be more than 2, preferably small holders, over a period of years. The experience gained in a pilot scheme should be helpful in formulating a more extensive and ambitious programme for the whole State. The land where the wells should be dug should be Government or Panchayat land or the land should be gifted by Government or Panchayat

2.8.9 On an average, a loan of Rs. 4,000 is advanced for dug wells by the Land Development Bank and the amount is recovered with interest in instalments over a period of 9-12 years. Government provides in the budget only 10 per cent of the total outlay for the dug wells schemes towards the purchase of debentures of the bank. The statistical details of the wells are given in Statement V.

2.8.10 The work done by the Land Development Bank from its inception up to 30th June, 1971 is given below :—

Sr. No.	Item of work	No.	Amount Rs.
1	New wells	1,76,232	44,33,73,996
2	Old wells (repaired)	38,805	4,30,78,509
3	Oil engines and electric motors	1,67,006	62,08,76,867
4	Tractors..	3,831	7,88,71,948
5	Other purposes	..	18,09,99,257
			1,36,71,98,577

It is estimated that the bank has given loans for more than 80 per cent of the total number of engine pumps installed after 1960 and probably more than 50 per cent of the total number of wells. As such, the bank's contribution towards the development of well irrigation in Gujarat State has been substantial.

2.8.11 The need for expeditious clearance of the Ground Water Directorate for schemes of wells etc. has already been emphasised. Subject to such clearance forthcoming, the bank can take up an extensive programme for advancing loans as shown hereunder :—

(Rs. in crores)

Sr. No.	Purpose	Fourth Plan.		Fifth Plan	
		No.	Amount	No.	Amount
1	Construction of wells including repairs to wells	1,58,800	40.61	1,69,700	41.75
2	Construction of tubewells ..	1,200	9.60	2,600	20.80
3	Installation of pumpsets ..	1,62,300	58.28	2,07,400	64.40
4	Lift irrigation schemes on rivers ..	100	0.80	100	0.80
5	Installation of underground pipelines ..	..	..	..	15.00
6	Others ..	..	19.72	..	12.00
	Total ..		129.01		154.75

All the finance required for the above schemes will be raised partly by share capital and mostly by raising debentures with the sanction of the State Government and Reserve Bank of India. The share of the State Government for purchase of debentures during the Fourth Plan is estimated to be around Rs. 12.50 crores and during the Fifth Plan around Rs. 15.00 crores. These estimates are on the basis of prevailing priorities of the Land Development Bank.

2.8.12 The Land Development Bank has, as indicated above, taken up a programme of financing lift irrigation schemes on such rivers where adequate water is available. These are to be financed by the Agriculture Refinance Corporation which demands the necessary certificate regarding availability of water. There is no special organisation even at the State level to investigate and locate suitable sites for such schemes. It is felt that such an organisation is urgently required to fill up the lacuna. It is, therefore, recommended that Government should immediately create at least one division in charge of an Executive Engineer to investigate and identify lift irrigation schemes in the State in the first instance and expand the same suitably depending on the rate of development of this important water resource.

Electrification of dug wells

2.8.13 Out of the total number of 6,11,000 dug wells in the State, 68,000 are electrified while 25,000 applications demanding electrification of wells are pending with the Gujarat Electricity Board. The increase in efficiency and consequent increase in production of crops due to electrification needs no emphasis. It is essential to electrify as many wells as possible depending on the availability of power which is the limiting factor. The experience of the GEB is that each well on an average consumes about 5 KW. of energy. If all the remaining 5,43,000 wells are electrified, they would require about 2715 MW of power net as against the present power availability of 894 MW in the State. By the end of the Fourth Plan this is expected to increase to about 1600 MW. In 1971 the GEB is supplying 340 MW to the agriculturists for dug wells which is more than 1/3 of the total power availability in the State. As the power requirement in the agriculture sector is seasonal in character, power planning cannot be done merely taking into account this requirement but it has to be taken in conjunction with the requirement of the industrial sector. As the target for power at the end of the Fifth Plan is 3300 MW the agriculture sector may possibly get 1000-1200 MW which will be adequate to electrify about 1,40,000 dug wells setting apart about 120 MW for the State tubewells. The rest will have to be energized by installing diesel engine pumpsets thereon.

2.8.14 As stated above it would not be physically possible to electrify all the dug wells and therefore a large number of them will have to be installed with diesel pumpsets In order that the farmers of the areas which are not covered by electricity are not placed in a disadvantageous position, it is essential that the price of the L. D. O. (Light Diesel Oil) should be regulated in such a way that the cost of running diesel pumpsets is almost at par with that for running electric pumpsets. The State should, therefore, keep this in view and adjust the levies on L. D. O. to avoid placing disincentive on the farmers running diesel pumpsets for increasing agricultural production.

2.8.15 Summarizing, there will be 6.11 lakh wells and 2.10 lakh pumpsets by the end of the Fourth Plan. 1.69 lakh additional wells could be constructed and 2.07 additional pumpsets could be installed during the Fifth Plan. Thus, there will be 7.80 lakh wells and 4.17 lakh pumpsets by the end of the Fifth Plan. Experience shows that about one-fourth of the dug wells are unsuccessful. Assuming that one-fourth of the wells will be unsuccessful, the number of wells needing energization will be 5 85 lakhs by the end of the Fifth Plan. Thus, 1.68 lakh wells will remain to be energized during the Sixth Plan.

2.9 Floods

2.9.1 Although Gujarat has large areas which are either arid or semi-arid, it is faced with the menacing problem of floods which cause large scale devastation and heavy loss of life and property. A number of villages had to be shifted and rehabilitated outside the flood zones.

2.9.2 The floods in Gujarat have peculiar characteristics. The rivers being flashy, the floods do not occur every year or alternate years but they occur at somewhat longer intervals. The floods, however, are of great magnitude. The flood discharges of the Tapi and Narmada compare with those of other big rivers of our country. Another characteristic of these floods is that they occur suddenly without sufficient warning. The floods bring with them huge quantity of silt every year. As a result, the mouths of rivers get silted up and the flood

tendency to rise even though the flood discharge may remain the same. Further, the major parts of the catchments of the big rivers such as the Tapi, Narmada and Mahi lie in the neighbouring States. The measures with regard to either flood forecasting or flood control would, therefore, have to be taken in a co-ordinated manner and all the States concerned have to be co-operative, if the measures are to be effective.

2.9.3 After the unprecedented floods of August, 1968 and September, 1970, causing colossal loss of life and property, Gujarat has been placed on the flood map of India. The measures with regard to flood control should also include afforestation, construction of reservoirs, construction of flood embankments, etc. It is urgently necessary to take up and complete as many flood control schemes as possible. With this end in view a special Flood Control Circle has been created in Public Works Department to deal with such schemes effectively and expeditiously. Further it is recommended that a Flood Control Board should be set up as early as possible to formulate policy with respect to floods and review the programme and progress of all the flood control schemes in the State.

2.9.4 The Master Plan for the flood control measures in the State, including soil conservation, drainage and anti-sea-erosion works envisages an outlay of about Rs. 47 crores. However, in view of the inter-State nature of big rivers like Narmada and Tapi, as stated earlier, it is imperative that the Central Government should plan and implement the different schemes basinwise in a co-ordinated manner. It is recommended that the Ministry of Food and Agriculture of the Government of India should take the initiative for formulating and supervising such schemes in the basins of all such rivers. It should be recognised that intensity of flood is much higher in lower reaches and they have to suffer the most. The measures of afforestation, soil conservation, etc. executed in the upper reaches would go a long way in alleviating the sufferings and damages to property and cattle in the lower reaches. The upper reaches also get benefit by way of increase in forest wealth, stopping soil erosion and raising of the water table, etc.

2.9.5 Flood Control Schemes

The Master Plan that was prepared in 1968 has been brought up-to-date and is now estimated to cost Rs. 46.5 crores. This plan envisages and makes provision for flood protective measures under the following main sub-heads :—

		(Rs. in lakhs)
1.	Sabarmati basin	526
2.	Vishvamitri basin	392
3.	Narmada basin	414
4.	Tapi basin	568
5.	Other rivers in the State	132
6.	Miscellaneous flood protective works	630
7.	Soil conservation	538
8.	Drainage works	928
9.	Anti-sea erosion	500
10.	Flood forecasting and warning system	22
		4,650

The Master Plan, however, does not include the cost of storage reservoir works that will be constructed for irrigation and/or hydro-power generation which provide incidental benefits of flood control.

Against an estimated cost of Rs. 46.5 crores envisaged in the Master Plan, a provision of Rs. 7.00 crores is made in the Fourth Plan. The provision includes a number of schemes on the various rivers in the State, the most important of which is the Tapi. The flood embankment scheme along the banks of the Tapi below Nana Varachha at vulnerable reaches of the river

combined with pitching of the river bank and other works has been cleared by the Planning Commission at an estimated cost of Rs. 5.21 crores. This scheme is being taken up for implementation. A provision of Rs. 80.00 lakhs is made for this scheme in the 1971-72 budget. 292 small schemes costing less than Rs. 3.00 lakhs each and costing totally Rs. 3.57 crores have been provided in the Fourth Plan. The Fourth Plan also provides for 33 Government works costing more than Rs. 3.00 lakhs each aggregating to Rs. 7.75 crores.

2.9.6 All these works are approved by the Technical Advisory Committee and also by the State Irrigation Board. The estimated cost of the Panchayat and Government schemes is Rs. 12.00 crores. Out of the Government works, 15 works estimated to cost Rs. 60.00 lakhs are approved by the Government and are being executed by the local officers. The provision in the Fourth Plan being Rs. 7.00 crores an amount of Rs. 5.00 crores will spill into the Fifth Plan.

New works costing another Rs. 10.00 crores can be taken up during Fifth Plan. The total, outlay in the Fifth Plan would thus come to Rs. 15.00 crores. The remaining works included in the Master Plan after the completion of the scheme proposed in the Fourth Plan and Fifth Plan would cost Rs. 25.00 crores.

2.9.7 The phasing during the various Plans in the flood control sector would be thus as under :—

	(Rs. in crores)
Fourth Plan	7.00
Fifth Plan	15.00
Sixth Plan	17.00
Seventh Plan	8.00
Total	47.00

2.10. Reclamation

2.10.1 Efforts to increase agricultural productivity have to be mooted on two fronts, namely, (*a*) providing irrigation facilities to the lands which are being cultivated and (*b*) reclaiming and irrigating the saline lands. Already the population has been increasing at a fast pace in the rural areas and the pressure on the existing limited cultivable land has been mounting. It would not, therefore, be enough to limit our attention to the cultivated lands only. Gujarat has a long coast line of 1600 kms. There are vast tracts of salt affected lands which would be reclaimed effectively if adequate water resources for flooding and leaching are available. A map showing total dissolved salt contours is appended herewith. The following are some of the suitable lands which could be speedily reclaimed :—

Sr. No.	Particulars	Gross area	
		In million hectares	In million acres
1	2	3	4
1	Banni area (Kutch district)	0.304	0.750
2	The Great Rann of Kutch-western part of Banaskantha district.	0.296	0.731
3	The Great Rann of Kutch, (Northern border area)	0.480	[illegible]
4	The Little Rann of Kutch	0.360	[illegible]
5	Coastal salines ..	0.160	[illegible]
	Total ..	1.600	[illegible]

Thus, in the long term planning of water resources development, the [illegible] and irrigation have to be taken into account.

2.10.2 The Little and Great Ranns of Kutch, including Banni area, comprise remaining of about 2.83 lakh hectares which is capable for being reclaimed provided adequate suppl fresh water is available for leaching. A Study Team of the Government of India visited areas and studied various aspects of feasibility of reclamation and submitted their report in No ber, 1966. After examining all alternative resources of water, the study team came to the c clusion that Narmada is the only source that could meet the requirements of reclamation irrigation of these vast stretches of lands. From the preliminary findings, the team opined t it is possible to reclaim the Banni and other areas in the Great Rann. Above all the te emphasized that, when reclaimed and irrigated, the fertile Banni area of 0.91 lakh hectares (2 lakh acres) has a potentiality of providing agricultural produce to the extent of 1,25, tonnes in addition to 26,100 bales of cotton, 32,600 tonnes of sugarcane and 1,80,000 tonnes vegetables. This certainly would be no small contribution to the nation. Further, the report of team unfolded vast potentialities of this region for the development of pastures, dairy industr forestry and salt industries. It recommended, *inter alia*, immediate undertaking of in tigations, surveys as well as three pilot projects for reclamation in the Banni and two fi experimentation projects in the Rann at an estimated cost of Rs. 38 lakhs.

2.10.3 In pursuance of these recommendations of the Experts' Committee a pilot proje for conducting investigations and experimental works in saline area estimated to cost about Rs crores was submitted to the Government of India in 1966 for obtaining assistance from the Uni Nations Special Fund. The same was not finalised and it was suggested by the Government India to undertake experiments on a small scale at State cost. Later on in September, 1969 modified draft scheme of pilot project estimated to cost Rs. 1.30 crores for conduct experiments, etc. has been submitted to the Government of India with a request to recomme the same for assistance from United Nations Development Programme funds. These experime are essential for establishing technical feasiblity of reclamation of saline lands and for evolv suitable leaching techniques, etc. The information and test results obtained will be of immer help in preparing detailed Master Plan of reclamation schemes. As a preliminary to this pi project, the State Government has already completed reconnaissance soil surveys.

2.10.4 The State Government has undertaken a pilot project in the Banni area of the Gr Rann of Kutch. The results of the experiments confirm the possibilities of reclamation, provic Narmada water is available. If sweet waters could be made available to the Banni area as w as the Ranns, large areas can be reclaimed at economical cost. Investigations so far undertak indicate little possibility of sweet waters from the surface and sub-surface resources in this ar The only source of substantial quantity of sweet water that can be envisaged would be from t Narmada canal.

2.10.5 Lump sum outlays of Rs. 5 crores, Rs. 30 crores and Rs. 15 crores are provided the Fifth, Sixth and Seventh Plans respectively for reclamation.

2.11 Soil Survey and Drainage

2.11.1 With the advent of irrigated agiculture in the State on completion of some major a several medium irrigation schemes, the problems of rising water tables and at some places wa logging have raised their head recently in the State. In Punjab, perennial irrigation through n work of canals has resulted in raising sub-soil water to such an extent that considerable area fertile land is threatened with becoming water logged and saline, unfit for cultivation. In order avoid similar situation in the commanded areas of irrigation projects in Gujarat and to deal wi the problem of drainage effectively, it is essential that soil surveys should be undertaken in all t parts of the State especially in the commanded areas of irrigation projects. Majority of the are under the command of the river valley projects in Gujarat State are under non-perennial ir gation and, hence, the problems of water logging and/or salinity have not been severe in any pa of the State so far. At present the drainage schemes are in progress in the commands of Kakrapa Mahi, Shetrunji and Bhogavo irrigation schemes. A detailed note on the present status kept at Appendix C. It is strongly recommended that the drainage project should be prepar simultaneously with the preparation of the project estimates for major irrigation schemes so th

main schemes. These drainage schemes should form a part of the overall plan of drainage and flood control of the entire area of the river basin.

2.11.2 As regards soil survey, it is recommended that in order to expedite and complete the soil survey work in the entire State, the present organisation under the Soil Survey Officer at Baroda should be strengthened and the members of this organisation should be trained in soil survey technology with respect to drainage, survey and interpretation of the available data, etc. It is also essential that the activities of the Soil Survey Organisation should have close co-ordination with its counterpart in the Agriculture Department. With Narmada likely to come up soon, the drainage organisation should be strengthened and poised to be ready to tackle this problem in a big way.

2.11.3 Instances of water logging and salinity have been noticed in the commanded areas of Kakrapar, Mahi and Shetrunji. As decided in the Irrigation Board a separate committee has been formed at State level to go into the problem of water logging and salinity and framing proposals for drainage systems in the commanded areas of these irrigation projects. The committee consists of the Chief Engineer (Irrigation) and Joint Secretary, Consultant to the Government, Superintending Engineers, Soil Survey Officer, M. L. As. and Presidents of District Panchayats. The committee has met four times and is likely to finalise its work and submit the final report within a very short time. Its recommendations should be examined expeditiously and action taken to set up an efficient drainage organisation in the State.

2.12 Desalination of Sea Water

2.12.1 Experiments on desalination have been carried out by the Central Salt and Marine Chemicals Research Institute, Bhavnagar as well as the Bhabha Atomic Research Centre at Trombay, the details of which are given in Appendix D. In view of the limited irrigation potential of surface waters in the State and in view of the large areas of short rainfall such as in Saurashtra and Kutch it is essential to start schemes of desalination of sea water and making it available at economical cost to cultivators, for irrigation should receive most urgent attention in Gujarat. It is time that Gujarat Government developed techniques to achieve this, so that the actual scheme could be taken up, say by the end of the Fifth Plan. In this context it is necessary and desirable that the State Government send a team of officers to Israel and Japan where such techniques have been developed and put to practical use, to study the methodology and exploitation of saline water for irrigation purpose, the economics of cultivation of such waters for cash crops or orchards, etc. After the study team makes its report the State Government should actively pursue the matter so that exploitation of sea water becomes a reality in the State in the next few years to augument the limited water resource of the State and to improve agriculture and horticulture. When an atomic plant is located in the State near the coast, the power therefrom could be beneficially exploited for such desalination scheme.

2.13 Irrigation Management

2.13.1 The present status of water rates that are charged to cultivators for various crops in different seasons and their comparison with those in other States is given in Appendix E. This shows that the prevailing rates in Gujarat are among the highest in the country.

2.13.2 Accordingly, it is recommended that periodical studies should be carried out, say once in two years, and the rates should be progressively increased with a view to meet the burden on account of the interest on the sum at charge (capital investment on reservoir and canal works) and operation and maintenance cost that is all recurring charges. The Fifth Finance Commission has also mentioned this underlying principle in their report (1969) and extract of which is given below :—

> " We consider that in the case of multipurpose river schemes (excluding the cost allocated to flood control) as well as irrigation (commercial), it should be possible for the States to take measures to increase their receipts so as to cover the working expenses on maintenance and management as well as interest on the capital outlay. Many agriculturists [illegible]

incurring higher costs in obtaining water from private sources, and there seems to be no reason why public sources of irrigation cannot be managed more satisfactorily so as to produce returns which can at least avoid loss. However, we have, for the present, assumed that within the next five years it would be possible for the State Government to take steps to improve the returns for covering the working expenses and interest at the rate of $2\frac{1}{2}$ per cent on the investment. As regards other departmental schemes and investments of State Government we have assumed that on the whole there would be no net loss and that these schemes and investments taken together will yield returns and dividends which would at least cover the interest charges on the capital involved. "

2.13.3 Likewise the water charges for Government tubewells need be suitably increased. It is well known that the cultivators are willing to take water from private tubewells at much higher rates and that the entire cost of the tubewells is recovered by their owners within a period of say, 5 to 10 years. The revenue from Govenment tubewells is not sufficient to cover even the operation and maintenance charges apart from meeting the interest on sum at charge. This situation should be altered by stepping up the water charges suitably so that the Government tubewells are run at least on no profit no loss basis, without incurring loss in running them year after year.

2.13.4 For efficient management of irrigation, Canal Advisory Committees have been formed to advise the Executive Engineer regarding distribution of water and other matters. Such committees include Government officers concerned, namely, the Superintending Engineer in case of major projects and the Executive Engineer in case of medium projects, the District Agriculture Officer, the District Co-operative Officer, representatives of District and Taluka Panchayats, local M.L. As. and some prominent irrigators of the area. In matters regarding actual and detailed distribution of water, the Deputy Engineer and Overseer take advice and help of Pani Panchayats comprising representatives of irrigators from a group of villages generally.

2.13.5 It is recommended that the prescribed practice of starting the distribution of water (rotation) from tail end upwards should be strictly enforced to safeguard the interest of tail enders and particularly smaller farmers. In order to ensure that the smaller farmers are not deprived of water in years of restricted availability of water, they should be given adequate representation on the Canal Advisory Committees and the Pani Panchayats.

2.13.6 The main problem in management and distribution of water is that a tremendous quantity of costly water is lost by evaporation from the reservoir as well as in transit in the canals and the water courses. In order to reduce these, the canals should be provided with lining and the water to the fields beyond outlets should be supplied through pipelines. Though these methods may involve heavy investment in the beginning, in the long run they will prove to be economical. In case of new tubewells Government has already laid down a policy of replacing the field channels by pipelines. Also the methods like sprinkler irrigation may be adopted if a group of farmers form a co-operative society for making maximum use of the water conserved at such higher cost. Moreover it shou'd be ensured that means/devices are available for measuring water supplies to agriculturists so that the most economical use of water is made and the State gets a proper return for the amount of water used by agriculturists. In order to minimise the losses due to evaporation from the surface of reservoirs, some experiments have been carried out by applying chemical films to the water surface in Aaji Reservoir (water supply) at Rajkot. The results of the experiment are promising and economically viable for water supply schemes. With the development of better and cheaper chemicals, it may be possible to apply this technique even to irrigation tanks, so that better utilisation could be achieved out of the same storage

2.13.7 At present for major and medium irrigation schemes the bills for recovery of water charges are prepared by the irrigation staff and sent to the officers of Revenue Department for the purpose of recovery. The Collector watches the work of recovery which is done through talaties. The talaties are under the administrative control of Panchayats. In minor irrigation schemes the Executive Engineer, Jilla Panchayat prepares the bills and sends them to the T. D. Os. for effecting recovery. Thus the work of recovery of irrigation charges is at present done by three

departments viz. Public Works Department, Revenue Department and Panchayats. Experience has proved that this system has not worked well from the point of view of Government, looking to the large amounts of arrears and from the point of view of the irrigators so far as their convenience of paying the charges is concerned. According to orders issued in May, 1971, the entire work of reecovery is decided to be transferred to Panchayats. Even this will not help much. What is necessary is creation of a separate organisation for recovery of irrigation charges working under the administrative control of Public Works Department. Actually such is the practice with the Gujarat Electricity Board which is also service organisation dealing directly with consumers. The GEB generates power, distributes it up to the consumers' point, prefers bills for electric charges and recovers the same. All this work is under the unitary admnistrative control, namely GEB and it is observed that the system is working satisfactorily. On the same analogy it is essential from different considerations that the PWD should prefer bills and collect the charges also so that the responsibility for this could be adequately discharged and the arrears minimised. It is urged that the Government should consider this afresh

2.14 Construction of field channels and area development

2.14 1 It has been the experience of the irrigation department that after the storage becomes available the canals are still lagging behind with the result that there is a considerable time lag in the utilisation of the irrigation potential created Such a situation is really serious as crores of rupees spent on the scheme do not yield the returns they ought to Field channels form the crucial part of area development programme. It is essential that the programme of construction of field channels is chalked out well in advance and should be strictly adhered to ensure their completion along with the sub-minors and outlets.

2.14.2 At present on irrigation works the Government constructs canals up to the smallest capacity of 0.0283 to 0.0424 cumecs (1 to 1½ cusecs) and expects that the farmers will construct their own field channels from the Government outlets onwards to their fields It is seen that on most of the projects the work of construction of field channels has lagged far behind the construction of canals resulting in less utilisation of created potential Even if it is taken for granted that the farmers have to pay for construction of field channels, the responsibility of doing so should not be left to the farmers themselves, because it is generally observed that they find it difficult to unite, co-operate and execute this work themselves. It is therefore felt that field channels should form a part of the project estimates and as the cost of the projects will increase, the cost criteria for sanctioning the project will have to be suitably enhanced The execution of field channels should be the responsibility of Government

2.14.3 Further, the situation is aggravated as the infra-structure in the commanded areas of irrigation projects is not ready for irrigated agriculture in time Consequently the targets set out while formulating the irrigation schemes as regard additional agricultural produce are not realised as envisaged. The Government has, therefore, decided that it is just not sufficient to complete the headworks and the canal systems alone in an irrigation project, but it is also necessary to take up simultaneously, the building of the infra- structure. This comprises the following items —

1. Construction of field channels and water courses
2. Land levelling
3. Land drainage (where necessary)
4. Agricultural support programme including T. C. D. farms, research centres etc
5. Availability of inputs like fertilisers, pesticides, improved seeds, etc
6. Credit facilities
7. Marketing and warehousing facilities

8. Network of roads in the command area, including farm roads

9. Consolidation of land holdings

10. Ground water investigation

2.14.4 In Gujarat State this approach has been first applied to the Mahi-Kadana Project which is a World Bank assisted project. The work of implementation of this programme is already proceeding according to a phased programme.

2.14.5 It is necessary to extend this concept to the other projects in the State also. This may, however, be limited to schemes having C. C. A. of 3000 hectares and more. For the present a detailed programme is prepared for the Ukai-Kakrapar Project costing Rs. 45 crores (Table) more or less on the lines of the Mahi Kadana Area Development Programme. For other projects in Gujarat region, the rate per acre has been adopted at Rs. 650 per hectare since they are small schemes as compared to Mahi-Kadana and Ukai-Kakrapar projects. For the projects in the Saurashtra-Kutch area also, a report has been prepared and the cost per hectare of C.C.A. has been assumed to be Rs. 625. The requirements will be less on account of the irrigation under these schemes being non-perennial.

TABLE

Financial provision required for area development of Ukai Project

		(Rs. in lakhs)
1.	Land levelling 1.00 lakh hectares (2.5 lakh acres) @ Rs. 1000 per hectare (Rs. 400 per acre) ..	1,000.00
2.	Kyari making 0.6 lakh hectares (1.50 lakh acres) @ Rs. 750 per hectare (Rs. 300 per acre) ..	450.00
3.	Field channels including field drains, 2.8 lakh hectares (7.0 lakh acres) @ Rs. 200 per hectares (Rs. 80 per acre) –	560.00
4.	Roads including farm roads etc. (lump)	1,636.00
5.	Agriculture support programme, including extension services, research, training facilities etc. T. C. D. Farms etc.	623.10
6.	Ground water investigation (Lump)	35.00
		4,304.10
7.	Contingencies at 5 per cent	215.21
		4,519.31
	Say, Rs. ..	45.00 crores

This corresponds to the C. C. A. of 4,18,000 hectares.
Therefore cost per hectare—Rs. 1,075,
Say Rs. 1,000.

2.14.6 An abstract of Area Development Programme for the entire Gujarat State, including the schemes which are completed, under progress and also certain schemes which are under

investigation is given in Table below. According to this cost of area development programme for the whole State (excluding Mahi-Kadana Project) works out to Rs. 98.18 crores covering Governmental and institutional finances.

TABLE

Area Development Programme for Gujarat State

Abstract of Cost

(Rs. in lakhs)

Sr. No.	Particulars	Gujarat region	Saurashtra and Kutch region	Total
1	*Fourth Plan*			
	(a) Completed schemes	971 92	1,300.30	2,272 22
	(b) Continuing schemes to be completed in the Fourth Plan.	2,327 60	82 60	2,410 10
	Total	3,299 42	1,382 90	4,682.32
2	*Fifth Plan*			
	(a) Continuing schemes of Fourth Plan to be completed.	1,844 95	25 00	1,869 95
	(b) New schemes of Fifth Plan to be completed	601 65	354.64	956.29
	Total	2,446.60	379.64	2,826 24
3	*Sixth Plan*			
	(a) Schemes of Fourth Plan to be completed	787.20	—	787.20
	(b) New schemes of Fifth Plan to be completed	331.84		331 84
	(c) New schemes of Sixth Plan to be completed	65.18		65 18
	Total	1,184.22		1,184 22
4	*Seventh Plan*			
	(a) Schemes of Sixth Plan to be completed	613 25		613 25
	(b) New schemes of Seventh Plan to be completed	112 41		112.41
	(c) Other medium schemes on lumpsum basis	350 00	50 00	400 00
	Total	1,075.66	50 00	1,125 66
	Grand Total	8,005 90	1,812.54	9,818.44

2.14.7 Alongwith the Government, a number of other institutional agencies are also involved in this area development approach and as such co-ordinated implementation of the programme for integrated development of the command areas of an irrigation project becomes very important from the point of view of extracting maximum benefits out of the available waters particularly with the completion of the storage facility.

2.14.8 It is recommended that as in the case of Mahi-Kadana Project, Government should undertake a study of other projects having a C. C. A. of 3000 acres or more, completed or nearing completion and formulate area development plans for them to be prepared as quickly as possible and to adopt this approach in all future projects [illegible] area development programme of Mahi-Kadana Project [illegible]

2.15 Water requirement for domestic use

2.15.1 Rough assessment of requirement of water for domestic purpose is 1.23 m.cu.m. (1 maft.) as under :—

1.	Ahmedabad	1,728 million litres per day (380 mgd.)
2.	Other cities with population of more than 1 lakh.	227 million litres per day (50 mgd.)
3.	Kandla	227 million litres per day (50 mgd.)
4.	Towns with population of more than 10,000.	545 million litres per day (120 mgd.)
5.	Diversified industries in Narmada command.	227 million litres per day (50 mgd.)
	Total ..	2,954 million litres per day (650 mgd.)
	i. e. approximately ..	1.23 milliard cubic metres (1.00 maft.)

2.16 Water Requirement for Industrial Use

As regards requirement of water for industries, a broad outline has been given by the Commissioner of Industries. According to this the total requirement of Industries works out to about 2682 million litres per day (590 mgd.), which includes tapping both surface and ground water. It is felt that water intensive industries should be preferably located in the belt south of Narmada where surplus water in adequate quantities will be available.

2.17 Inland Fisheries

With the large storage of water in Gujarat for the first time, sweet water or inland fishculture is also likely to develop. Though this has no direct bearing on irrigation it is necessary that legislation or regulation for licensing fishing and other activities in and around reservoirs may be adopted. Under these requirements, the Public Works Department may be given control to prevent (1) abuse of the facilities, (2) damage to structures, (3) misuse of water, and (4) unhealthy competition for fishing rights, etc. This would help in co-ordinating activities such as establishing of recreational facilities, tourists' resorts, tank-bed cultivation, boating, preservation of game sanctuaries, etc. at the reservoir site.

2.18 Utilisation of Sewage Water

Many Municipalities are now-a-days treating the sewage water and use the same after mixing the same with canal water or alone on the contiguous farms. Such scheme should become universal, practically in all urban areas. If executed properly, they will not only be self-supporting but would be a source of revenue for the local bodies and contribute to increasing agricultural production. If necessary, Government should render assistance by way of advancing loan to the local authorities to undertake such treatment schemes. It is recommended that a special technical cell may be set up in the Panchayats and Health Department for giving technical guidance to the local bodies for sewage treatment and its distribution.

CHAPTER III

IMPLEMENTATION

3.1 Manpower Planning for Engineering Cadres and Incentives

In view of the heavy investment in irrigation proposed, it will be necessary to do manpower planning very much in advance rightaway so that adequate number of men in different disciplines, different age-groups, etc., are available with the department in the subsequent Plans. Advance action is necessary to build up the cadres and train them. There is reluctance on the part of new engineering graduates joining Government service in view of the better prospects in private sector. In order to provide incentives to new blood coming into Government service progressively, it is necessary to provide more attractive pay scales and better service conditions. It is necessary that Government should devote careful attention to inducing talented personnel in the engineering services rightaway on contract system or other.

3.2 Skilled and Semi-skilled Cadres

3.2.1 Universities should start special subjects and training facilities should be made available to turn out skilled and semi-skilled personnel mainly for construction works, such as artisans, mistries, etc. who are even at present in very short supply Experience of Government on Ukai shows that ample human material in rural and Adivasi areas is available for recruitment and these persons could be trained in the above trades. This will incidentally throw up better advocations to the less fortunate people in the Adivasi and Backward areas

3.2.2 Training facilities should be provided in areas close to irrigation projects where they can get actual work experience near their habitation as far as possible This could be arranged in co-ordination with the Education Department.

3.3 Training and Research

The need for training and research in irrigation branch of the administration should not be under-estimated in view of the long strides Gujarat wants to make in the next two Plans. Care should, however, be exercised in selecting the right type of personnel, so that their experience will be available in various schemes where specially trained officers are required Special running scales of pay should be thought of for officers engaged largely in research and designs to utilise their services in specialised fields and prevent their migration to other assignment on promotion, etc. A note on engineering research and training programme is given at Appendix G. The setting up of a staff college by the Government to impart in-service training is a step in right direction. Diversified training courses will be conducted for officers at different levels in service. Depending upon the experience gained by the staff college, there has to be constant evaluation and assessment as to how far they meet the short term and long term objectives with varying requirement of the department so as to put the organisation on sound footing

3.4 Equipment, Machinery and Steel

3.4.1 *Planning for scarce materials, equipment and spares to be imported.*—A close watch would need to be kept with reference to the availability of various construction materials and equipments so that progress is not held up at any stage. At present the entire country is experiencing acute shortage of (all categories of) steel. In spite of the imports, the demand is [illegible] partially and the project works get a set-back. Similarly a close watch would need to be [illegible] on the new construction methods and techniques so as not only to expedite the construction [illegible] also to economise the cost. Large river valley projects need heavy earthmoving equipment [illegible] dam and main canal works. Although the indigenous production of equipment and

CHAPTER IV

CONCLUSION AND RECOMMENDATIONS

A. Perspective Plan at a Glance

(a) Total cultivated area . . 97.13 lakh hectares (240 lakh acres)

(b) Progress and programme :

(i) Multipurpose, Major and Medium Irrigation Schemes

		No.	Potential (excl. Narmada) lakh hectares	(lakh acres)	
Completed upto 1966	..	35	3.[illegible]0	(8.42)	(after reappraisal
Completed upto 1969	..	41	4.57	(11.29)	
Completed upto 1971	..	47	[illegible].14	(12.69)	
Targetted upto 1974	..	53	8.17	(20.21)	
Targetted upto 1979	..	104	11.[illegible]8	(28.86)	
Targetted upto 1984	..	119	13.63	(33.68)	
Ultimate	..		14.52	(35.89)	

(ii) Minor Irrigation Schemes

Completed upto 1966	..	952	1.42	(3.51)
Completed upto 1969	..	1026	1.56	(3.87)
Completed upto 1971 (1970)	..	1039	1.71	(4.23)
Targetted upto 1974	..	N. A.	2.12	(5.24)
Targetted upto 1979	..	N. A.	2.51	(6.21)
Targetted upto 1984	..	N. A.	2.68	(6.63)
Ultimate ..	..		2.68	(6.63)

(iii) Tubewells

Completed upto 1966	..	1048	0.49	[illegible]
Completed upto 1969	..	1355	[illegible]	[illegible]
Completed upto 1971	..	1448	[illegible]	[illegible]
Targetted upto 1974	..	[illegible]	[illegible]	[illegible]
Targetted upto 1979	..	[illegible]	[illegible]	[illegible]
Targetted upto 1984	..	[illegible]	[illegible]	[illegible]
Ultimate	..	[illegible]	[illegible]	[illegible]

(c) Total Irrigation Potential
(From Government Finance)

	Potential (excl. Narmada) lakh hectares	(lakh acres)	
Potential by 1966	5.32	(13.15)	
Potential by 1969	6.80	(16.75)	
Potential by 1971	7.58	(18.72)	
Potential by 1974	11.22	(27.75)	
Potential by 1979	15.61	(38.57)	
Potential by 1984	17.73	(43.81)	
Potential by ultimate stage ..	21.58	(53.32)	(without Narmada and dugwells.)

(d) Expenditure (From Government Finance)

	Rs. in crores
Upto 1966 (end of Third Plan) ..	118.00
Upto 1969	174.53
Upto 1971	215.61
Upto 1974	307.47
Upto 1979	565.67
Upto 1984	820.88

B. Conclusion

The table below gives the proposed Government outlays as well as those by the Land Development Bank and the physical targets expected to be achieved at the end of each Plan as well as the ultimate potential (excluding Narmada) in nutshell :—

I. Physical : Cumulative potential

lakh hectares (acres)

	Plan				
	Fourth	Fifth	Sixth	Seventh	Ultimate
(a) From Government Finances					
(i) Multipurpose, Major and Medium Irrigation Schemes.	8.17 (20.21)	11.68 (28.86)	13.63 (33.68) 17.67 (43.68) @	14.52 (35.89) 26.91 (66.49) @	14.52 (35.89)
(ii) Minor Irrigation : Tanks and Bandharas etc.	2.12 (5.24)	2.51 (6.21)	2.68 (6.63)	2.68 (6.63)	2.68 (6.63)
Tubewells	0.93 (2.30)	1.42 (3.50)	1.42 (3.50)	1.42 (3.50)	4.37 (10.80)*
Total ..	11.22 (27.75)	15.61 (38.57)	17.73 (43.81) 21.78 (53.81)	18.62 (46.02) 31.01 (76.62)	21.57 (53.32)
(b) From Land Development Bank and A. R. C. Finance					
(i) Dugwells			N. A. †		
(ii) Pumping sets					
(iii) Tubewells	0.97 (2.40)	3.08 (7.60)	3.08 (7.60)	3.08 (7.60)	
Total ..	0.97 (2.40)	3.08 (7.60)	3.08 (7.60)	3.08 (7.60)	..
Grand Total ..	12.19 (30.15)	18.69 (46.17)	20.81 (51.41) 24.86 (61.41) @	21.70 (53.62) 34.09 (84.22) @	21.57 (53.32)

Number	
Fourth Plan	Fifth Plan
1200	3800

* Rough estimate; as exploration is going on.

† No reliable data about (i) and (ii) are available.

@ These figures indicate irrigation potential with Narmada.

(Rs. in crores)

	Plan				
	Fourth	Fifth	Sixth	Seventh	Total
(a) From Government Finance					
(i) Multipurpose, Major and Medium Irrigation Schemes	103 00	201.00	226 41	169 77	700.18
(ii) Minor Irrigation : Tanks and Bandharas ..	*12 22	24 20	11 80	—	48.22
Tubewells	5 50	18 00	—	—	23 50
(iii) Flood Control ..	7.00	15 00	17.00	8 00	47 00
Total	127 72	258 20	255 21	177 77	818 90
(iv) Electrification of Government Tubewells	1 00	3 96	0 40	.	5.36
Total	128 72	262 16	255 61	177 77	824 26
(b) From Land Development Bank and Agricultural Refinance Corporation Finance	No assessment of institutional finances is made.				

* This does not include Rs. 5 22 crores for Rural Works Programme

C. Recommendations

(Para numbers in the brackets)

1. All feasible major and medium schemes in Saurashtra, Kutch and North Gujarat which are relatively low rainfall areas should be given high priority [2 2 1 (ii) and (iii)]

2. Only the schemes located in higher rainfall areas and the schemes dependant on Narmada Project and a few schemes which are difficult ones and which are yet to be investigated should spillover into the Sixth Plan and beyond. (2.2.4)

3. It is recommended that ground water resources should be scientifically and expeditiously xplored (2.7.1.)

4. All successful tubewells should be electrified soon after they are drilled and the programme electrification should be accelerated by the Gujarat Electricity Board. (2.7.12)

5. Ground Water Investigation Directorate should give expeditious clearance or opinion private tubewells and wells. (2.8.2)

6. Government should undertake the schemes of recharging in selected areas on an imental basis to formulate its future policy. (2 8.3)

Agriculture Department should open a survey, statistical and research cell for main- up-to-date and reliable record of all wells and private tubewells as well as the pumpsets d, electrified and also regarding the number of wells going derelict, the areas of interference.

8. A benchmark survey should be taken up immediately to know the present status of dug wells in the State and thereafter repeated biannually to formulate future policy and such wells should receive close attention as they have a crucial role to play in irrigating vast areas of the State. (2.8.4)

9. The full rates charged for irrigation on wells within 30m. (100 feet) of canals should be reduced. (2.8.6.)

10. The charges for hiring blasting unit for deepening wells should be reviewed by Government to make the programme more popular. (2.8.7)

11. The Government should formulate a large programme of community wells in selected backward areas of the State. (2.8.8)

12. Government should immediately create at least one division to investigate and identify lift irrigation schemes in the State so that the programme of financing lift irrigation schemes by the Land Development Bank may not be handicapped in the absence of the necessary certificate regarding the availability of water for such schemes. (2.8.12)

13. It is urgently necessary that flood control schemes are taken up immediately and completed as early as possible. (2.9.3).

14. The Ministry of Food and Agriculture (Government of India) should take the initiative for formulating and supervising flood control schemes for inter-State rivers. (2.9.4)

15. The drainage project should be prepared simultaneously with the preparation of the project estimates for major irrigation schemes. In view of the Narmada coming up, an adequate drainage organisation should be built and trained. (2.11.1, 2.11.2).

16. Soil survey work in the entire State should be completed expeditiously and organisation for it strengthened. It should have close co-ordination with its counter-part in the Agriculture Department. (2.11.2)

17. Studies should be carried out periodically, say once in two years, to increase the water rates progressively. Water rates for Government tubewells should be stepped up to avoid incurring of loss in running them. (2.13.2, 2.13.3)

18. The distribution of water (rotation) from tail end upward should be strictly enforced. (2.13.5)

19. The programme of field channels should be strictly adhered to ensure their completion alongwith sub-minors and outlets. (2.14.1)

Area development schemes for important irrigation projects should be undertaken on the lines of Mahi-Kadana Project. (2.14.8)

20. Water intensive industries should be preferably located in the belt south of Narmada where surplus water in adequate quantities will be available. (2.16).

21. It is necessary that legislation or regulation for licensing fishing and other activities in and around reservoirs may be adopted. (2.17)

22. A special technical cell may be set up in Panchayats and Health Department for giving technical guidance to the local bodies for sewage treatment and its distribution. (2.18)

23. In view of the projected heavy investments in irrigation, advance action is necessary to build up cadres and train them. (3.1)

Government should devote careful attention to inducing talented personnel in the engineering services rightaway. (3.1)

The need of training and research in irrigation branch of the administration should not be under-estimated (3.3)

24. Universities should start special subjects and make available training facilities to turn out skilled and semi-skilled personnel mainly for construction works such as artisans, mistries and so on (3.2 1)

25. Advance planning is a must for equipment and machinery needed for the project to be completed in Fifth and Sixth Plans and training of selected personnel in "material planning and management." (3.3, 3.4 1).

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STATEMENT

Status of Multipurpose, Major and Medium

Sr. No.	Particulars	Pre-Plan	First Plan	Second Plan	Third Plan	Cumulative at the end of Third Plan
1	2	3	4	5	6	7
1	(a) New schemes of the Plan ..	..	33	27	..	60
	(b) Continuing schemes in the Plan	..	..	31	48	..
	(c) Completed schemes during the Plan *(list attached)*	..	2	10	23	35
	(d) Spillover of the Plan ..	..	31	48	25	25
2	(a) Outlay provided during the Plan (in Rs. lakhs)	..	1015.00	3542.19	4,011.00	10068.88
	(b) Expenditure incurred during Plan (in Rs. lakhs)	..	1015.08	3552.50	4457.70	9925.94
3	Potential created in lakh hectares / lakh acres during the Plan	..	0.23 0.68	2.26 5.58	2.22 5.50	4.71/3.41 11.67/8.42*
4	Utilisation in lakh hectares / lakh acres during the Plan	..	..	0.66 1.64	1.06 2.63	1.72 4.27

Irrigation Schemes up to Fourth Plan

Three Annual Plans	Achievement during 1969 70 and 1970-71	Achievement at the end of March, 1971 (anticipated)	Fourth Plan targets	Cumulative targets at the end of Fourth Plan	Remarks
8	9	10	11	12	13
..	16	76	43	103	
25	19	..	19	.	
6	6	47	12	63	
19	29	29	50	50	
4641.00	4,040 00	18,749.88	11000.00	25709 88	
4,792 25	3,454 00	18,172 19	11000 00	25718 19	
1.18 / 2 87	0 55 / 1.40	5 14 / 12 69	3 61 / 8 02	8 08 / 20 21	*Reappraised figures
1.2 / 2.97	0 76 / 1.78	3 65 / 9 02	3 24 / 8 01	6 16 / 15 25	

List of completed Major and Medium Schemes upot 31st March, 1971

Sr. No.	Name of the Project	Estimated cost in Rs. lakhs	District	Year of completion	Benefits (At the end of 1969-70) Potential in Hectares/Acres	Utilisation in Hectares/Acres	
1	2	3	4	5	6	7	
1	Karol ..	11.35	Sabarkantha	1965-66	320/800	..	This is supplementing Khari Cut Canal.
2	Patadungri ..	85 28	Panchmahals	1965-66	3,140/7,851	3,431/8,578	
3	Heran (G) ..	18.75	Baroda	1966-67	2,200/5,500	3,445/8,613	..
4	Machhundri ..	23.03	Junagadh	1965-66	440/1,100	304/759	
5	Raval ..	10.96	Junagadh	1965-66	440/1,100	380/950	
6	Munjiasar ..	53.82	Amreli	1956-57	1,320/3,300	1,066/4,165	
7	Gondli ..	21.54	Rajkot	1956-57	924/2,312	1,166/2,914	
8	Ozat ..	53.22	Junagadh	1965-66	2,360/5,800	2,076/5,190	
9	Aji ..	68.75	Rajkot	1965-66	1,120/2,800	480/1,200*	*This is a water supply scheme.
10	Sakroli ..	24.18	Rajkot	1965-66	1,204/3,010	1,766/4,415	
11	Sasoi ..	84.06	Jamnagar	1965-66	3,020/7,550	3,284/8,210	
12	Gheé ..	22.59	Jamnagar	1965-66	820/2,050	1,030/2,575	
13	Malan ..	41.86	Bhavnagar	1957-58	2,300/5,750	2,112/5,281	
14	Harnav-I ..	46.14	Sabarkantha	1968-69	1,900/4,750	1,020/2,550	
15	Moti-Fatewadi	59.17	Ahmedabad	1965-66	12,800/32,000	19,079/47,699	
16	Karad ..	99.88	Panchmahals	1965-66	4,480/11,200	2,683/6,708	
17	Machhu-I ..	158.34	Rajkot	1960-61	6,680/16700	9,338/23,346	
18	Ghelo ..	48.51	Bhavnagar	1968-69	3,100/7,750	2,211/5,527	
19	Sapada ..	17.72	Jamnagar	1967-68	962/2,405	588/1,471	
20	Rojki ..	27.01	Bhavnagar	1965-66	1,520/3,800	1,584/3,960	
21	Vartu ..	56.76	Jamnagar	1970-71	1,000/2,500	993/2,482	
22	Hiran ..	90.81	Junagadh	1965-66	2,400/6,000	727/1,818	
23	Bhogavo-I ..	72.39	Surendranagar	1968-69	1,420/3,800	2,445/6,113	
24	Demi ..	49.83	Jamnagar	1965-66	1,560/3,900	2,739/6,848	
25	Bhogavo-II ..	66.74	Surendra-nagar.	1965-66	600/1,500	1,264/3,159	
26	Limdi (Bhogavo)	58.14	Surendranagar	1965-66	3,160/7,900	2,507/6,267	
27	Fulzar ..	44.59	Jamnagar	1965-66	1,200/3,000	1,285/3,216	
28	Moj ..	94.45	Rajkot	1965-66	4,756/11,890	7,328/18,321	
29	Brahmani ..	90.85	Surendra-nagar.	1965-66	3,800/9,500	10,015/25,038	
30	Rangola ..	66.36	Bhavnagar	1965-66	3,460/8,650	4,940/12,349	
31	Suvi ..	34.59	Kutch	1965-66	1,320/3,300	1,445/3,613	
32	Niruna ..	48.43	Kutch	1970-71	1,600/4,000	481/1,203	
33	Kaila ..	14.24	Kutch	1956-57	866/2,162	757/1,992	
34	Kanakavati ..	16.51	Kutch	1956-57	1,540/3,850	1,446/3,616	
35	Puna ..	26.4	Jamnagar	1965-66	1,000/2,500	686/1,715	
36	Gajod ..	12.56	Kutch	1956-57	1,140/2,850	815/2,038	
37	Sanandra ..	11.63	Kutch	1956-57	660/1,650	724/1,810	

Sr. No.	Name of the Project	Estimated cost in Rs. lakhs	District	Year of completion	Benefits (At the end of 1969-70)	
					Potential in Hectres/Acres	Utilisation in Hectares/Acres
1	2	3	4	5	6	7
38	Ver-I	9 08	Surat	1959-60	1,360/3,400	824/2,059
39	Doswada	6 35	Surat	1957-58	911/2,278	907/2,267
40	Surajwadi		Bhavnagar	1953-54	1,032/2,580	987/2,468
41	Bhimdad		Bhavnagar	1953-54	1,140/2,850	732/1,829
42	Hathmati .	544 68	Sabarkantha	1969-70	16,150/39,953	7,800/19,269
43	Meshwa ..	314 33	Sabarkantha	1969-70	15,000/37,063	12,250/30,259
44	Shetrunji (Palitana) .	696 00	Bhavnagar	1965-66	34,400/86,000	19,968/49,920
45	Dantiwada .	1,087 94	Banaskantha	1970-71	41,024/1,02,561	17,629/43,823
46	Shetrunji (Khodiar) .	190 88	Amreli	1968-69	7,200/19,000	7,37,334/18,336
47	Bhadar	417 29	Rajkot	1969 70	16,800/42,000	17,971/44,928

STATEMENT

Status of Minor Irrigation Schemes upto

Sr. No.	Particulars	Pre-Plan	First Plan	Second Plan	Third Plan	Cumulative at the end of Third Plan
1	2	3	4	5	6	7
1	(a) Number of schemes completed ..	N. A.	619	201	132	952
	(b) Continuing	N. A.	N.A.	N. A.	N.A.	N. A.
2	(a) Outlay provided (Rs. in lakhs) ..	N. A.	N.A.	N.A.	512.93	512.93
	(b) Expenditure incurred (Rs. in lakhs) ..	N. A.	286.81	406.96	410.64	1,104.41
3	(a) Potential created Lakh hectares	0.51	0.42	0.33	0.15	1.41
	Lakh acres	1.27	1.06	0.81	0.37	3.51
	(b) Utilisation Lakh hectares	0.51	0.27	0.11	0.17	1.06
	Lakh acres	1.27	0.67	0.28	0.41	2.63

II

Fourth Five Year Plan Excluding Tubewells (Tanks and Bandharas)

Achievement of Annual Plans	Achievement during 1969-70 and 1970 71	Cumulative by March, 1971	Fourth Plan target	Rural Works Programme target	Cumulative target Col 7+8+11+12	Remarks
8	9	10	11	12	13	14
74	13 in '69-70 Not finalised 1970-71	1,039 up to March 1970	N A.	N A	N.A.	
N A	N.A	N A	N.A.	N A	N.A.	
431 27	828 19	N A	1,222 00	522 38	N.A	
533 15	390 11	2,033 67 (Anticipated)	1,222 00 (Anticipated)	522 38	3,381 94 (Anticipated)	
0 15 / 0 36	0 15 / 0.36	1 71 / 4 23	0.47 / 1 16	0 08 / 0 208	2 11 / 5 24	
0 02 / 0 07	0.06 / 0 16	1 14 / 2 86	0.29 / 0 73	0 05 / 0 13	1.42 / 3.56	

STATEMENT

Status of Minor Irrigation Schemes (Tubewells)

Sr. No.	Particulars	Pre-Plan	First Plan	Second Plan	Third Plan
1	2	3	4	5	6
1	*No. of Schemes*—				
	(a) Completed	27	336	390	295
	(b) Continuing	NA	NA	NA	255
2	*Outlay* (Rs. in lakhs)	NA	NA	NA	450.00
	Expenditure incurred (Rs. in lakhs)	NA	139.00	248.97	350.62
3	*Benefits*—				
	(a) Potential created in lakh hectares	0.01	0.11	0.19	0.18
	lakh acres	0.026	0.26	0.47	0.46
4	Utilisation as on 3/71 in lakh hectares	0.01	0.02	0.20	0.05
	lakh acres	0.021	0.06	0.48	0.14
5	Electrification of tubewells	22 Nos.	.	133 Nos.	39 Nos.
6	Survey and investigation for groundwater potential	100 sq. m.	1,853 sq. m.	1,650 sq. m.	1.392 sq. m.

upto Fourth Five Year Plan

Cumulative at the end of Third Plan	Three Annual Plans	Achievement during 1969-70, 1970-71	Cumulative at the end of March, 1971	Fourth Plan target	Cumulative Target	Remarks
7	8	9	10	11	12	13
1,048	308	92	1,448	300+100 R W P	1,656+100 R W P.	1,356 Nos. upto 31st March 1969
255	NA	NA				
450 00 / 768 59	356 00 / 328 37	281 81 / 251 04	1,087 81 / 1,348 00	550 / 550	1,356 00 / 1,646 96	+First and Second Plan outlay (Proposed)
0 49 / 1.21	0 15 / 0 37	0 09 / 0 24	0 73 / 1 82	0 21 / 0 52	0 85 / 2 10	
0 29 / 0.70	0 13 / 0 32	0 02 / 0 05	0 44 / 1 07	0 13 / 0 32	0 55 / 1 34	
194 Nos	511 Nos	162 Nos	867 Nos	250 Nos	955 Nos	705 Electrified upto 31st March 1969
6,025 sq m.	200 sq m.	1,270 sq m	6,495 sq m.	5,000 sq m	10,225 sq m.	

STATEMENT

Status of Minor Irrigation Schemes (Tubewells)

Sr. No.	Particulars	Pre-Plan	First Plan	Second Plan	Third Plan
1	2	3	4	5	6
1	*No. of Schemes—*				
	(a) Completed . .	27	336	390	295
	(b) Continuing . .	NA	NA	NA	255
2	*Outlay* (Rs. in lakhs)	NA	NA	NA	450.00
	Expenditure incurred (Rs. in lakhs)	NA	139.00	248.97	380.62
3	*Benefits—*				
	(a) Potential created in lakh hectares	0.01	0.11	0.19	0.18
	lakh acres	0.026	0.26	0.47	0.46
4	Utilisation as on 3/71 in lakh hectares	0.01	0.02	0.20	0.06
	lakh acres	0.021	0.06	0.48	0.14
5	Electrification of tubewells	22 Nos.	..	133 Nos.	39 Nos.
6	Survey and investigation for groundwater potential	100 sq. m.	1,853 sq. m.	1,680 sq. m.	1,392 sq. m.

upto Fourth Five Year Plan

Cumulative at the end of Third Plan	Three Annual Plans	Achievement during 1969-70, 1970-71	Cumulative at the end of March, 1971	Fourth Plan target	Cumulative Target	Remarks
7	8	9	10	11	12	13
1,048	308	92	1,448	300+100 R W P.	1,656+ 100 R W. P.	1,356 Nos upto 31st March 1969
255	NA	NA				
450 00 / 768 59	356 00 / 328 37	281 81 / 251 04	1,087 81 / 1,348 00	550 / 550	1,356 00 / 1,646 96	+ First and Second Plan outlay (Proposed)
0.49 / 1.21	0.15 / 0 37	0 09 / 0 24	0 73 / 1 82	0 21 / 0 52	0 85 / 2 10	
0 29 / 0.70	0 13 / 0 32	0 02 / 0 05	0 44 / 1 07	0 13 / 0 32	0 65 / 1 34	
194 Nos.	511 Nos.	162 Nos	867 Nos	250 Nos	955 Nos	705 Electrified upto 31st March 1969
5,025 sq m.	200 sq m.	1,270 sq m	6,495 sq m.	5,000 sq m	10,225 sq m.	

STATEMENT IV

Statement showing Irrigation Potential and Utilisation in First, Second, Third and Fourth Plans

Figures in lakh hectares / acres

Sr. No.	Sectoral Head	Prior to First Plan		During First Plan		At the end of First Plan		During Second Plan		At the end of Second Plan		Targets during Third Plan (Additional)		Achievement during Third Plan		Achievement at the end of Third Plan		Achievement during 1966-67	
		Potential	Actual Irrigation	Potential	Actual Irrigation	Potential	Actual Irrigation	Potential	Acutal Irrigation	Potential	Actual Irrigation	Potential	Actual Irrigation	Potential	Actual Irrigation	Potential	Actual Irrigation	Potential	Actual Irrigation
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.	Major and Medium Irrigation,	.. / ..	.. / ..	0.23 / 0.58	.. / ..	0.23 / 0.58	.. / .	2.25 / 5.58	0.66 / 1.64	2.48 / 6.16	0.66 / 1.64	2.98 / 7.37	1.39 / 3.44	2.22 / 5.50	1.06 / 2.63	4.91 / 12.17	1.00 / 4.72	0.44 / 1.10	0.26 / 0.64
																(3.41) / (8.42)			
2	Minor ..	0.51 / 1.27	0.51 / 1.27	0.42 / 1.06	0.27 / 0.67	0.93 / 2.33	0.78 / 1.94	0.33 / 0.81	0.11 / 0.28	1.26 / 3.14	0.89 / 2.22	0.23 / 0.56	0.28 / 0.68	0.15 / 0.37	0.17 / 0.41	1.41 / 3.51	1.06 / 2.63	0.04 / 0.10	0.01 / 0.3
3	Tubewells ..	.. / ..	.. / ..	0.11 / 0.26	0.02 / 0.06	0.11 / 0.26	0.02 / 0.06	0.19 / 0.47	0.20 / 0.48	0.30 / 0.73	0.22 / 0.54	0.45 / 1.12	0.27 / 0.66	0.18 / 0.46	0.06 / 0.14	0.48 / 1.19	0.28 / 0.68	0.01 / 0.03	0.06 / 0.15
	Total ..	0.51 / 1.27	0.51 / 1.27	0.76 / 1.90	0.29 / 0.73	1.27 / 3.17	0.80 / 2.00	2.77 / 6.86	0.97 / 2.40	4.04 / 10.03	1.77 / 4.40	3.66 / 9.05	1.94 / 4.78	2.55 / 6.33	1.29 / 3.18	6.80 / 16.87	3.24 / 8.03	0.49 / 1.23	0.33 / 0.82
																(5.30) / (13.12)			

STATEMENT IV—*concld.*

Figures in lakh hectares / acres

Sr. No.	Sectoral Head	Achievement at the end of 1966-67		Achievement during 1967-68		Achievement at the end of 1967-68		Achievement during 1968-69		Achievement at the end of 1968-69		Achievement during 1969-70		Achievement at the end of 1969-70		Target during 1970-71		Likely Achievement at the end of 1970-71		Targets of Fourth Plan (Additional)	
		Potential	Actual Irrigation	Potential	Actual Irrigation	Potential	Actual Irrigation	Potential	Actual Irrigation	Potential	Actual Irrigation	Potential	Utilisation	Potential	Utilisation	Potential	Utilisation	Potential	Utilisation	Potential	Utilisation
1	2	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	Major and Medium Irrigation	3.85	2.16	0.27	0.42	4.12	2.58	0.27	0.53	4.39	3.11	0.28	0.20	4.67	3.31	0.46	0.34	5.13	3.65	4.04	3.24
		9.52	5.36	0.67	1.03	10.19	6.39	0.68	1.30	10.87	7.69	0.68	0.49	11.55	8.18	1.14	0.84	12.69	9.02	9.40	8.01
2	Minor	1.45	1.06	0.03	—	1.48	1.07	0.08	0.01	1.56	1.01	0.04	—	1.60	1.08	0.11	0.06	1.71	1.14	0.47	0.29
		3.61	2.06	0.07	0.01	3.68	2.67	0.19	0.03	3.87	2.70	0.09	—	3.96	2.70	0.27	0.16	4.23	2.56	1.36	0.73
3	Tubewells	0.49	0.34	0.04	—	0.53	0.34	0.10	0.07	0.63	0.41	0.06	—	0.69	0.41	0.03	0.02	0.72	0.43	0.21	0.13
		1.22	0.83	0.10	—	1.32	0.83	0.24	0.17	1.56	1.00	0.16	0.01	1.72	1.01	0.08	0.04	1.80	1.05	0.52	0.32
	Total ..	5.79	3.57	0.34	0.42	6.13	3.99	0.45	0.61	6.58	4.60	0.38	0.20	6.96	4.80	0.60	0.42	7.56	5.22	4.72	3.60
		14.35	8.85	0.84	1.04	15.19	9.89	1.11	1.50	16.30	11.39	0.93	0.50	17.23	11.89	1.49	1.04	18.72	12.93	11.28	9.06

NOTES. — (1) Figures in bracket show the reappraised irrigation potential.

(2) The figures of Major and Medium Irrigation are revised on account of reappraisal of irrigation potential and taking into account as Hathmati, Khari, Meshwa canals. The position is as under :—

The figures at the end of Second and Third Plans vary because of addition of these old existing works and reappraisal potential.

	At the end of 1965-66 Potential	Utilisation
Major and Medium Irrigation ..	4.70	1.72
	11.60	4.27
Old existing schemes	0.21	0.18
	0.51	0.45
	4.91	1.90
	12.17	4.72

The potential of $\frac{4.91}{12.17}$ $\frac{\text{hectares}}{\text{acres}}$ is now reappraised as $\frac{3.41}{8.42}$ $\frac{\text{hectares}}{\text{acres}}$

STATEMENT IV

Statement showing Irrigation Potential and Utilisation in First, Second, Third and Fourth Plans

Figures in lakh $\frac{\text{hectares}}{\text{acres}}$

Sr. No.	Sectoral Head	Prior to First Plan		During First Plan		At the end of First Plan		During Second Plan		At the end of Second Plan		Targets during Third Plan (Additional)		Achievement during Third Plan		Achievement at the end of Third Plan		Achievement during 1966-67	
		Potential	Actual Irri-gation	Potential	Actual Irri-gation	Potential	Actual Irri-gation	Potential	Acutal Irri-gation	Potential	Actual Irri-gation	Potential	Actual Irri-gation	Potential	Actual Irri-gation	Potential	Actual Irri-gation	Potential	Actual Irri-gation
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.	Major and Medium Irrigation,	../..	./..	0.23/0.58	../..	0.23/0.58	../.	2.25/5.58	0.66/1.64	2.48/6.16	0.66/1.64	2.98/7.37	1.39/3.44	2.22/5.50	1.06/2.63	4.91/12.17 (3.41)/(8.42)	1.00/4.72	0.44/1.10	0.26/0.64
2	Minor ..	0.51/1.27	0.51/1.27	0.42/1.06	0.27/0.67	0.93/2.33	0.78/1.94	0.33/0.81	0.11/0.28	1.26/3.14	0.89/2.22	0.23/0.56	0.28/0.68	0.15/0.37	0.17/0.41	1.41/3.51	1.06/2.63	0.04/0.10	0.01/0.3
3	Tubewells ..	../..	../..	0.11/0.26	0.02/0.06	0.11/0.26	0.02/0.06	0.19/0.47	0.20/0.48	0.30/0.73	0.22/0.54	0.45/1.12	0.27/0.66	0.18/0.46	0.06/0.14	0.48/1.19	0.28/0.68	0.01/0.03	0.06/0.15
	Total ..	0.51/1.27	0.51/1.27	0.76/1.90	0.29/0.73	1.27/3.17	0.80/2.00	2.77/6.86	0.97/2.40	4.04/10.03	1.77/4.40	3.66/9.05	1.94/4.78	2.55/6.33	1.29/3.18	6.80/16.87 (5.30)/(13.12)	3.24/8.03	0.49/1.23	0.33/0.82

STATEMENT VI

Principal Data Relating to Agriculture and Food Production in 1968-69

(Statewise and all India)

STATEMENT

Principal Data Relating to Agriculture and Food

Sr. No.	State	Estimated mid year population 1968 (in thousands)	Total cropped area 1967-68 in thousand hectares (acres)	Cropped area per 1000 persons in hectares (acres)	Irrigated area 1968-69		
					(a) Major and medium in thousand hectares (acres)	(b) Minor in thousand hectares (acres)	(c) Total Major, medium and minor in thousand hectares (acres)
1	2	3	4	5	6	7	8
1	Andhra Pradesh	41,553	12,869 (31,800)	309 (765)	2,427 (5,995)	1,473 (3,640)	3,900 (9,635)
2	Assam ..	15,123	2,873 (7,100)	189 (468)	83 (208)	685 (1,695)	768 (1,903)
3	Bihar ..	55,090	10,886 (26,900)	197 (487)	1,864 (4,607)	1,654 (4,087)	3,518 (8,694)
4	*Gujarat* ..	**25,189**	**10,441 (25,800)**	**416 (1,028)**	**467 (1,154)**	**910 (2,251)**	**1,377 (3,405)**
5	Haryana ..	9,500	5,058 (12,500)	534 (1,320)		(Cols. 6–14	Included in
6	Jammu and Kashmir.	3,939	809 (2,000)	204 (507)	61 (153)	241 (597)	302 (750)
7	Kerala ..	20,296	2,751 (6,800)	135 (335)	337 (834)	252 (625)	589 (1,459)
8	Madhya Pradesh ..	38,823	19,547 (48,300)	503 (1,245)	940 (2,324)	683 (1,690)	1,643 (4,014)
9	Maharashtra ..	47,673	19,142 (47,300)	402 (995)	623 (1,541)	1,270 (3,140)	1,893 (4,681)
10	Mysore ..	27,985	10,441 (25,800)	374 (925)	616 (1,967)	712 (1,761)	1,528 (3,728)
11	*Orissa* ..	20,674	7,486 (18,500)	362 (895)	1,090 (2,695)	654 (1,618)	1,744 (4,313)
12	Punjab ..	13,935	5,463 (13,500)	390 (965)	3,264 (8,067)	1,713 (4,235)	4,977 (12,302)
						(Cols. 6–14	Including
13	Rajasthan ..	24,868	16,552 (40,900)	663 (1,640)	829 (2,550)	1,470 (3,634)	2,299 (6,164)
14	Tamil Nadu ..	38,174	7,325 (18,100)	191 (474)	1,272 (3,594)	1,564 (3,865)	2,836 (7,457)
15	Uttar Pradesh ..	86,889	22,663 (56,000)	259 (642)	2,999 (7,412)	4,611 (11,396)	7,610 (18,808)
16	West Bengal ..	42,591	6,677 (16,500)	157 (394)	1,098 (2,714)	999 (2,470)	2,097 (5,184)
	All India ..	5,23,893	1,60,983 (4,03,000)	307 (768)	18,170 (45,815)	18,891 (47,255)	37,061 (93,070)

Production in 1968-69 (Statewise and all India)

Irrigated area available per 1000 persons: (a) Major and medium in hectares (acres)	(b) Minor in hectares (acres)	(c) Total major, medium and minor in hectares (acres)	Percentage of irrigated area to cultivated area: (a) Major and medium	(b) Minor	(c) Total major, medium and minor	Food production 1968-69 (thousand tonnes)	Food production per capita per year (tonnes)	Remarks
9	10	11	12	13	14	15	16	17
58 (144)	35 (88)	93 (232)	18 8	11 4	30 2	6 846 9	0 164	
5 (14)	45 (112)	50 (126)	2 9	23 9	26 8	2,304 4	0 152	
33 (84)	29 (74)	62 (158)	17 1	15 2	32 3	8,869 9	0 161	
18 (46)	36 (89)	54 (135)	4 5	8 7	13 2	2,345 9	0 093	
Punjab)						2,006 2	0 316	
15 (39)	61 (152)	76 (191)	7 7	29 9	37 6	1,099 2	0 280	
16 (41)	12 (31)	28 (72)	12 4	9 3	21 7	1,427 4	0 070	
24 (60)	17 (44)	41 (104)	4 8	3 5	8 3	9,460 0	0 243	
12 (32)	29 (74)	42 (106)	3 3	6 6	9 9	7,157 2	0 150	
28 (71)	25 (63)	53 (134)	7 6	6 8	14 4	5,049 4	0.179	
52 (130)	31 (78)	83 (208)	14 6	8 7	23 3	5,420 4	0 262	
139 (344)	72 (180)	211 (524)	31 0	16.3	47 3	6,252 1	0 449	
Haryana)								
41 (102)	59 (146)	100 (248)	6.2	8 9	15 1	4,006 8	0 161	
38 (94)	40 (101)	78 (195)	19 7	21 4	41 1	3,415 3	0.141	
34 (85)	53 (131)	87 (216)	13.3	20 4	33 7	16,296 2	0 150	
25 (64)	23 (58)	48 (122)	16.5	15 0	31 5	71,62 3	0 168	
35 (89)	36 (90)	72 (179)	11.3	11 7	23 0	91,012 6	0 179	

STATEMENT VII

Statement showing the Perspective Financial Planning for the Fifth, Sixth, and Seventh Plans period (1974 to 1989) for Multipurpose, Major and Medium Irrigation Schemes including Flood Control and Minor Irrigation

(Rs. in lakhs)

Item	Particulars	Estimated cost	Fifth Plan	Sixth Plan	Seventh Plan	Remarks
1	2	3	4	5	6	7
1. (a)	Spillover schemes of the Fourth Plan	*10,121.53	†8,721.53	†1,400.00		Fourth Plan provision is Rs. 110.00 crores.
(b)	Continuing schemes ..		50	2		†Spillover details given in Statement IX.
(c)	Schemes completed at the end of the Plan.		48	2		
2.	New schemes					
(a)	Proposed in Fifth Plan	9,474.00	983.47**	4,341.00	2,788.00	Rs. 1,361.53 lakhs will be spillover of Seventh Plan.
(i)	New schemes ..		12	..	..	
(ii)	Schemes completed at the end of the Plan.		3	8	Kadana H. L. Canal will be spillover of Seventh Plan.	
(b)	Proposed in Sixth Plan	1,484.00	..	600.00	884.00	
(i)	New schemes ..			9		
(ii)	Schemes completed at the end of the Plan.			5	4	
3.	Narmada Project Irrigation Part	45,860.00	9,500.00	13,000.00	11,500.00	Beyond Sixth Plan there will be spillover of Rs. 118.60 crores for the Narmada Project and Rs. 13.60 crores for Kadana High Level Canal.
4.	Reclamation works ..	5,000.00	500.00	3,000.00	1,500.00	
5.	Flood control ..	4,700.00	1,500.00	1,700.00	800.00	
6.	Other works like research, investigation, workshop, etc.	6,000.00	395.00	300.00	305.00	
7.	Total		21,600.00	24,341.00	17,777.00	
8.	Minor Irrigation (*vide* Statements XIV and XV).					
(a)	Irrigation ..		2,420.00	1,180.00	..	
(b)	Tubewells ..		1,800.00	..	..	Not projected.
9.	Total for Minor Irrigation		4,220.00	1,180.00	..	
10.	Grand Total ..		25,820.00	25,521.00	17,777.00	

EXPLANATORY NOTES :

1. * The estimated cost of all the schemes which will spillover into Fifth Plan is Rs. 351.3945 crores out of which an outlay of Rs. 101.2153 crores is required for completing them in Fifth Plan and Sixth Plan.

2. ** Against the total of Rs. 216 crores in Fifth Plan after providing the outlay on the spillover scheme, Narmada Project and Item Nos. 4 and 5 above, only a balance of Rs. 9.8347 crores will be available for new schemes.

3. † For electrification of tubewells a sum of Rs. 1.0 crore is provided in Fourth Plan in the rural electrification programme under Power sector. A sum of Rs. 3.96 crores is required in Fifth Plan to electrify 990 tubewells and Rs. 0.40 crores for rest 100 in Sixth Plan (Please see Statement XVI).

STATEMENT VIII

Statement showing the perspective planning, physical targets and utilisation of the surface water for the Multipurpose, Major and Medium Irrigation Schemes including Flood Control for the period Fifth, Sixth and Seventh Plans (1974-1989)

Sr No.	Particulars	Upto Fourth Plan		Fifth Plan		Sixth Plan		Seventh Plan	
		Potential in hectares (acres)	Utilisation in m cu m. (Maft)	Potential in hectares (acres)	Utilisation in m cu m. (Maft)	Potential in hectares (acres)	Utilisation in m cu m (Maft)	Potential in hectares (acres)	Utilisation in m.cu m (Maft)
1	2	3	4	5	6	7	8	9	10
1	Spillover schemes of the Fourth Plan.	8,18,051 (20,21,460)	7.24 (5 95)	3,36,710 (8,32,000)	3 02 (2 45)	87,415 (2,16,000)	0 04 (0 035)		.. .
				11,54,795 (28,53,460)	10 36 (8 40)	12,42,210 (30,69,460)	11 40 (9 035)	12,42,210 (30,69,460)	11.24 (9 035)
2	*New schemes*								
	(a) To be taken up in Fourth Plan.			13,102 (32,735)	0 12 (0 096)	83,003 (2,05,100)	0 74 (0 603)	52,651 (1,30,000)	0 47 (0 382)
				13,102 (32,735)	0 12 (0 096)	96,251 (2,37,835)	0 86 (0 699)	1,48,862 (3,67,635)	1 332 (1 081)
	(b) To be taken in the Sixth Plan.					24,727 (61,100)	0.22 (0 18)	36,827 (91,000)	0 33 (0 268)
						24,727 (61,100)	0 22 (0 18)	61,554 (1,52,100)	0 55 (0 448)
	Total	8,18,051 (20,21,460)	7.24 (5 95)	3,49,812 (8,64,735)	3 14 (2 546)	1,95,145 (4,82,200)	1 00 (0.818)	89,438 (2,21,000)	0 801 (0 650)
				11,67,897 (28,86,195)	10 48 (8 496)	13,65,188 (33,68,395)	12 22 (9 914)	14,52,626 (35,89,395)	13 02 (10 564)
3	Kadana High Level Canal.		.					2,02,343 (5,00,000)	1.81 (1.47)
								2,02,343 (5,00,000)	1.81 (1.47)
4	Narmada Project ..		.			4,04,686 (10,00,000)	3 625 (2 94)	8,90,309 (22,00,000)	7 978 (6 47)
						4,04 686 (10,00,000)	3 625 (2 94)	12,94,995 (32,00,0)	11 603 (9 41)
	Grand Total .	8,18,051 (20,21,460)	7.24 (5 95)	3,49,812 (8,64,735)	3 14 (2 546)	5,99,831 (14,82,000)	4 625 (3 753)	11,82,000* (29,21,000)*	10.589 (8 530)
				11,67,897 (28,86,195)	10 48 (8 496)	17,69,874 (43,68,395)	15 845 (12 854)	29,49,964 (72,89,385)	26 437 (21.444)
								2,59,000† (6,40,000)†	2.218 (1.88)
								2,59,000† (6,40,000)†	2.218 (1.88)
								9,23,000 (22,81,000)	8 477 (6.71)
								26,90,964 (66,49,385) Net	24.219 (19 564)

* Gross

† This figure will be reduced by 2,59,000 hectares (6,40,000 acres) corresponding to Mahi Stage I command on account of supply of water from Narmada Canal giving a net potential at the end of Seventh Plan as 26,90,964 hectares (66,49,385 acres)

NOTE : (i) Utilisation is worked out at the rate of 1.118 lakh hectares per M. cu. m. (2.4 lakh acres per Maft.) of water. (ii) Denominator indicates cumulative figures at the end of respective Plans

STATEMENT

Statement showing outlays and targets (Potential) in the

Scheme No. (Fourth Plan)	Name of the Scheme	Location (District)	Financial Outlays: Estimated cost	Actual expenditure upto 1968-69	Fourth Plan outlay	Spillover outlay in Fifth and subsequent Plans
1	2	3	4	5	6	7
	A—Continuing Schemes					
248	Ukai	Surat	10,443.31	4,676.52	3,500.00	2,266.79
249	Narmada	Broach	*	443.40	1,500.00	N.A.
250	Mahi Stage I	Kaira	2,457.00	1,750.00	715.00	..
251	Kadana	Panchmahals	2,100.14	250.63	1,450.00	399.51
252	Kakrapar	Surat	*1,857.00	1,691.38	65	48.62
252A	Raising of Kakrapar weir ..	Surat	30.45	..	N.A.	N.A.
253	Machhu-II	Rajkot	213.88	82.98	193	..
254	Sabarmati (Dharoi) ..	Mehsana	1,655.00	5.86	700	949.14
255	Saraswati	Mehsana	212.00	107.65	105	..
256	Rudramata	Kutch	106.00	797.79	22	4.21
257	Gajansar	Kutch	20.00	9.22	11	..
258	Goma	Bhavnagar	85.00	52.08	23	9.92
259	Dhatarwadi	Amreli	105.00	0.88	103	1.12
260	Kalindri	Junagadh	43.00	0.68	44	..
261	Miscellaneous Schemes of Third Plan (nearing completion)		..	5,183.92	100	..
	Total : Spillover of Fourth Plan ..		26,568.23	14,357.92	8,531	3,679.31
	B—New Schemes					
	(*i*) GUJARAT					
262	Damanganga	Bulsar	1,738.76	..	50	1,688.76
263	Watrak	Sabarkantha	295.65	..	50	245.65
264	Panam	Panchmahals	1,011.19	..	10	1,001.19
265	Sipu	Banaskantha	550.00	..	50	500.00
266	Ver-II	Surat	99.00	..	45	54.00
267	Harnav-II	Sabarkantha	130.91	..	40	90.91

Fourth Plan of Multipurpose, Major and Medium Schemes

(Rs. in lakhs)
(Potential in '000 hectares)

Physical targets in potential in '000 hectares					
Estimated benefit	Potential at the end of 1968 69	Cumulative Fourth Plan Target	Fifth and subsequent Plan potential	Present status	Target of completion
8	9	10	11	12	13
158 05	..	68.79	89 26	Headworks almost completed Canal works in progress	1976
N.A.	.	.	N A	*Before Tribunal	
186.30	94 33	179 92	6 38	Only some works on the canal system remain	1974
89 50	.	72 84	16.16	Works in progress	1976
228 00	120 68	227 94	0 06	*Revised A A Remaining works on canal system and remodelling work in progress	1975
N.A.		..	N A.	Work nearing completion	
7 70	.	7 70	..	Work in progress	1973
48.95		..	48 95	Work recently started	1976
8.75	..	8.75	.	Head works completed canal works in progress	1973
3 00	2 40	3 00	.	Main scheme completed only improvement remaining	1975
1.62	..	1 62	..	Canal works remain	1974
2 53	.	1 44	1 09	Head works in progress	1975
2.48	..	2 48	.	—Do—	1975
1.58	..	0 90	0 68	Works in progress	1974
241 42	213 94	236 78	4 64		
979 89	440.13	810 82	169.16		
46.58	..	..	46 58 *(11.78 34.80)	Clearance pending from C. W. & P. C.	Sixth Plan
14 58	.	..	14.58	Part T. S. given Works to start shortly	[illegible]
21.87	.	..	21 87	Recently cleared by Planning Commission.	[illegible]
25.31	..	..	25.31	Clearance to be obtained from C. W. & P. C.	[illegible]
1 82	..	..	1 82	Project report under [illegible]	[illegible]
3 31	..	..	3.31	Under investigation	[illegible]

STATEMENT

Scheme No. (Fourth Plan)	Name of the Scheme	Location (District)	Financial Outlays			
			Estimated cost	Actual expenditure upto 1968-69	Fourth Plan outlay	Spillover outlay in Fifth and subsequent plans
1	2	3	4	5	6	7
268	Machhannala ..	.. Panchmahals	36.00	..	11	25.00
269	Rami ..	.. Baroda	28.60	..	7	21.60
270	Baldeva ..	.. Broach	46.00	..	10	36.00
271	Pigut ..	.. Broach	17.00	..	5	12.00
272	Vaidy ..	.. Broach	17.86	..	4	13.86
273	Bajajsagar ..	.. (Rajasthan State)	900.00	..	750	150.00
	(ii) SAURASHTRA					
274	Madhuvanti ..	.. Junagadh	51.81	..	51	0.81
275	Phophal ..	.. Rajkot	129.80	..	129	0.80
276	Fulzar-II ..	.. Jamnagar	22.10	..	21	1.10
277	Sukhbhadar ..	.. Surendranagar	99.66	..	20	79.66
278	Dhari ..	.. —do—	27.51	..	6	21.51
279	Bagad ..	.. Bhavnagar	75.21	..	17	58.21
280	Singhoda ..	.. Junagadh	153.96	..	29	124.96
281	Aji-II ..	.. Rajkot	52.94	..	22	30.94
282	Nyari ..	.. Rajkot	77.49	..	12	65.49
283	Chhaparwadi (Jetpur) ..	Rajkot	80.17	..	16	64.17
284	Chhaparwadi (Lunivav) ..	Rajkot	26.80	..	6	20.80
285	Jhanjeshwari ..	.. Junagadh	66.00	..	10	56.00
286	Ambajal ..	.. Junagadh	51.00	..	10	41.00
287	Rawal-II ..	.. Junagadh	132.00	..	11	121.00
288	Machhundri ..	.. Junagadh	84.00	..	10	74.00
289	Sorthi ..	.. Junagadh	59.00	..	6	53.00
290	Sani ..	.. Jamnagar	60.00	..	9	51.00
291	Venu-II ..	.. Rajkot	90.00	..	7	83.00
292	Weir on Bhadar	.. Rajkot	50.00	..	9	41.00
	(iii) KUTCH					
293	Kaswati ..	.. Kutch	31.47	..	10	21.47
294	Nara ..	.. Kutch	77.79	..	16	61.79
295	Other Medium Schemes in Gujarat State					
	(i) GUJARAT					
1	Karjan ..	.. Broach	300.00	..	..	1,300.00
2	Deo Irrigation Scheme ..		N. A.	..	..	..
3	Bhadar ..	.. Panchmahals	636.36	..	..	..

(Potential in '000 hectares)
(Rs in lakhs)

Estimated benefit	Potential at the end of 1968 69	Cumulative Fourth Plan Target	Fifth and subsequent Plan potential	Present status	Target of completion
Physical targets in potential in '000 hectares					
8	9	10	11	12	13
2.16	..	..	2.16	Project report under scrutiny	1975
1.24	..	..	1.24	—do—	1975
1.08	..	.	1.08	—do—	1975
0.40	..	..	0.40	Under investigation—to be taken up as minor irrigation scheme	
1.33	.	..	1.33		
..	..	.	..		
2.19	.	2.14	0.05	Works in progress	1975
4.18	.	4.18	..	—do—	1975
0.69	.	0.69	..	Recently started	1975
5.47	.		5.47	Under investigation	1978
0.77	.		0.77	T S accorded-works to be started shortly	1976
1.32	..	..	1.32	—do—	1970
5.47	..	..	5.47	Project report under scrutiny	1978
.	.	..	..	To be taken up as water supply Schemes	
.	..	..	.		
2.94	..	..	2.94	Project report under scrutiny	1977
0.83	..	..	0.83	—do—	1977
1.73	..	..	1.73	T S accorded-works to be started shortly	1975
1.48	..	..	1.48	Under investigation	1977
4.20	..	..	4.20	—do—	1978
5.74	..	..	5.74	Project report under scrutiny	1975
1.86	.	..	1.86	Works in progress	1977
1.38	..	..	1.38	Project report under scrutiny	1977
2.54	..	..	2.54	Under investigation	1978
.	..	..	..	—do—	1978
0.83	..	..	0.83	Project report under scrutiny	1977
1.34	..	..	1.34	Works to be started shortly	1977
65.00		..	65.00	Under investigation (12.40 + 52.60)	Fourth Plan.
6.68		..	6.68	—do—	Fifth Plan
4.96		..	4.96	Under investigation	1977

STATEMENT

Plan No.	Name of the Scheme	Location (District)	Financial Outlays: Estimated cost	Actual expenditure upto 1968-69	Fourth Plan outlay	Spillover outlay in Fifth and subsequent Plans
1	2	3	4	5	6	7
	(ii) SAURASHTRA					
4	Raising of Moj dam ..	Rajkot	51.00	..	..	51.00
5	Kalubhar	Bhavnagar	158.00	..	..	158.00
6	Amipur	Junagadh	75.00	..	..	75.00
7	Jivepur (UND) ..	Jamnagar	50.00	..	..	50.00
8	Ghodadhrai	Rajkot	80.00	..	..	80.00
9	Sheda-Bhadtharai ..	Jamnagar	50.00	..	..	50.00
10	Uben	Junagadh	45.08	..	..	45.08
11	Heran	Junagadh	206.36	..	..	206.36
	(iii) KUTCH					
12	Jangadia	Kutch	42.00	..	..	42.00
13	Bhukhi	Kutch	55.00	..	..	55.00
14	Bita-Valadia	Kutch	35.00	..	..	35.00
				..		(—)20.00*
	Total, New Schemes of Fourth Plan ..		8,571.22	Nil.	1,479	7,092.22
	Grand Total, Spillover and New Schemes ..		35,139.45	14,347.92	10,010	10.771.53
	C—Miscellaneous					
296	Surveys and Investigation ..	..	..	..	39,27	170.00
297	Research ..	..	..	..	76.56	80.00
298	Workshops and Training	..	..	..	138.98	40.00
299	Flood Control ..	..	..	83.16 +22.30	700.00	..
	Total Miscellaneous ..	..	..	—360.27	990.00	
	Grand Total Multipurpose, Major and Medium Irrigation Schemes		35,139.45	14,718.19	11,000.00	*10,771.53

*Lumpsum Provisions

**Total Spillover

Additional amount expected.

(a) Bajajsagar
(b) Bhadar (Panchmahals)

Less Shares from other sectors :

Panam
Damanganga
Dharoi

*All the spillover schemes of the Third Plan except Damanganga and Karjan Projects will be completed in 52.60 thousand hectares respectively.

(Potential '000 hecta
(Rs. in lakhs)

Estimated benefit	Physical targets-potential: Potential at the end of 1968-69	Cumulative Fourth Plan Target	Fifth and subsequent Plan potential	Present status	Target of completion
8	9	10	11	12	13
0.67	..	0.67	..	Works to be started shortly	1974
2.31	..	..	3.31	Under investigation	Fifth Plan
N. A	.	..	..	—do—	—do—
2 56			2.56	—do—	—do—
1.60			1.60	—do—	—do—
			..	To be taken up as minor irrigation scheme	
1 21		.	1.21	Under investigation	Fifth Plan 1979
10.89	..	..	10.89	—do—	
0 60	.	..	0.60	—do—	Fifth Plan
N. A.	..	..	..	—do—	—do—
0.50	..	..	0.50	—do—	—do—
262 82	7.68	Nil	7,255 14		
1242.70	440 13	818 40	424.30		
(3,069.46) (Thousand acres)	(2,021 46) (Thousand acres)		(1,048 00) (Thousand acres)		
1,240 70	440.13	818.40	424.30		
1,242.70	440.13	818 40	424 30		

Rs 10,771.53 lakhs

Rs. 250 00 lakhs
Rs 300.00 lakhs

Rs. 11,321.53 lakhs

Rs. 200 00 Lakhs
Rs. 400 00 Lakhs
Rs. 600 00 Lakhs

Rs. 1,200 00 Lakhs

Net Spillover .. Rs. (—)1,200 00 lakhs

Rs. 10,121 53 lakhs.

[illegible]e Fifth Plan; the spillover potentials of which in the Sixth Plan are 34.90 thousand hectares and

STATEMENT XI

Statement showing the details and phasing of potential for new schemes to be taken up in the Fifth Plan

Figures in thousand hectares (acres)

Sr. No.	Name of the scheme	Total potential	Potential proposed to be created in: Fifth Plan	Sixth Plan	Seventh Plan	Remarks
1	2	3	4	5	6	7
1	Heran	42.493 (105)		18.21 (45)	24.28 (60)	
2	Sukhi	20.23 (50)		12.14 (30)	8.094 (20)	
3	Orsang	31.97 (79)		11.73 (29)	20.235 (50)	
4	Kadana High Level Canal	404.68 (1,000)			202.34 (500)	202.34 (500) in Eighth Plan
5	Mitti	1.163 (2.875)	1.163 (2.875)	..	..	
6	Godathad	0.671 (1.66)	0.671 (1.66)	..		
7	Zankhari	11.088 (27.4)	.	11.088 (27.4)	.	
8	Dam on river Nani Vahial	6.353 (15.7)		6.353 (15.7)		
9	Hadaf	11.857 (29.3)	10.11 (25.00)	1.740 (4.3)	.	
10	Wankleshwar Bhey	1.294 (3.2)	1.294 (3.2)		..	
11	Guhai	9.874 (24.4)	.	9.874 (24.4)		
12	Mazam	11.857 (29.3)	..	11.857 (29.3)		
		653.53 (1,367.837)	13.238 (32.735)	82.93 (205.10)	254.919 (630.00)	

STATEMENT XIII

Statement showing the details and phasing of potential for new schemes to be taken up in the Sixth Plan

Figures in thousand hectares (acr

Sr. No.	Name of the scheme	Total potential	Potential proposed to be created in			Remark
			Sixth Plan	Seventh Plan	Eighth Plan	
1	Weir at Antapur	7.44 (18.4)	2.18 (5.4)	5.26 (13.0)		
2	Reservoir at Kelia	1.53 (3.8)	1.53 (3.8)			
3	Pick up weir at Sara	3.92 (9.7)	3.92 (9.7)			
4	Khanddolpur scheme	1.33 (3.3)	1.33 (3.3)			
5	Pick up weir at Sidhpur	1.90 (4.7)	1.90 (4.7)			
6	Dam on river Tan	2.75 (6.8)	0.72 (1.8)	2.02 (5.0)		
7	Pick-up weir at Delti	9.83 (24.3)	3.76 (9.3)	6.07 (15.0)		
8	Dam at Manal and weir near Kothar	2.75 (6.8)	0.72 (1.8)	2.02 (5.0)		
9	Scheme on river Man	1.58 (3.92)	1.29 (3.2)			
10	Other schemes					
	(a) Gujarat	25.49 (63.00)	4.04 (10.00)	21.44 (53.00)		
	(b) Saurashtra	01.94 (4.80)	1.94 (4.80)			
	(c) Kutch	1.33 (3.30)	1.33 (3.30)	..		
		61.79 (152.82)	24.66 (61.10)	36.81 (91.00)		

STATEMENT XV

Perspective Planning of Tubewells for Fifth and Sixth Plans (1974 – 1984)

Sr. No.	Particulars	Fourth Plan	Fifth Plan	Sixth Plan	Remarks
1	2	3	4	5	6
1	No of tubewells proposed to be drilled under the Government sector	300 100(RWP)	600	.	Ground water potential based on preliminary assessment would be fully exploited by the end of the Fifth Plan.
2	No of tubewells proposed to be drilled under private sector through L. D. B and A. R. C.	1,200	2,600	.	
3	Requirement of funds for Government sector. (Rs. in lakhs)	Rs 550 Rs 100 (RWP)	Rs 1,800		This includes Rs 500 lakhs for investigations. No funds required for private sector are indicated here as the same will be loaned to the private individuals by the A R C through L. D B
4	Benefit: Potential to be created during the Plan. .. . lakh hectares / lakh acres	0 21 / 0 52 +0 20 (RWP)	0 50 / 1 20		
5	Electrification of tubewells ..	*250 Nos.	*990 Nos	+100 Nos.	*Statement attached. No funds provided as this is to be carried out by G. E. B by loan from Rural Electrification Programme.
6	Surveys and investigation square kms (sq miles)	12,950 (5,000)	1,60,618 (62,015)	..	Full exploration of the entire State is planned to be completed by the end of the Fifth Plan by enormous expansion of the establishment set up and the equipment

STATEMENT XVI

Tubewells Electrification Programme

Sr. No.	Particulars	Fifth Plan	Sixth Plan
1	No. of Tubewells to be electrified	990	100
2	Funds to be provided in Rural Electrification Programme for loan to Gujarat Electricity Board (Rs. in lakhs).	396	40

Electrification Programme

Sr. No.	Particulars	Three Annual Plans 1966-67, 1967-68, 1968-69		Fourth Plan		Total during Fourth Plan	At the end of the Fourth Plan	Fifth Plan		Sixth Plan
		During	At the end of	During 1969-70 and 1970-71	During remaining period of the Fourth Plan			Additional	Total at the end of *Fifth* Plan	

STATEMENT XVII

Statement giving details of Rural Works Programme—Crash Programme during the Fourth Plan (1969-74)

Sr. No.	Name of District	No. of tubewells to be drilled	Remarks
1	Amreli	10	All found infeasible
2	Kutch	11	
3	Jamnagar	20	4 Nos. found infeasible
4	Panchmahals .	14	All found infeasible
5	Banaskantha	46	
6	Mehsana	12	
7	Rajkot	4	One found infeasible
8	Surendranagar	12	
		129	
		(—) 29	Found infeasible
		100	

(Amount in lakh Rs.)

STATEMENT XVIII

Statement giving status of Minor Irrigation (Districtwise) as in August, 1971

Sr. No.	District	Spillover schemes in the Fourth Plan		Schemes sanctioned		Schemes in advanced stage of investigation		Schemes yet to be investigated		Total		Remarks
		No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Ahmedabad ..	7	18.25	3	15.26	3	30.25	21	28.19	34	91.95	This statement does not include schemes sanctioned by the Panchayats costing less than Rs. 1 lakh.
2	Amreli ..	8	16.49	12	121.84	3	20.57	10	91.58	33	250.48	
3	Kutch ..	14	34.93	41	345.87	23	147.60	26	53.18	105	581.67	
4	Kaira ..	10	32.85	4	25.13	2	11.09	55	66.48	71	135.55	
5	Jamnagar ..	8	36.30	8	77.78	11	111.12	7	62.90	34	288.10	
6	Junagadh ..	11	4.33	8	52.71	7	123.96	9	33.94	35	214.94	
7	Panchmahals ..	28	79.36	44	305.19	20	146.41	99	583.75	191	1,114.71	
8	Banaskantha ..	13	21.49	12	100.51	12	49.09	63	201.65	100	372.74	
9	Broach ..	9	9.03	37	38.13	5	54.53	28	97.50	79	199.19	
10	Bhavnagar ..	6	27.72	11	84.70	12	99.46	40	138.48	69	350.36	
11	Mehsana ..	10	6.14	1	5.84	2	27.68	24	45.65	37	85.31	
12	Rajkot ..	11	22.06	22	225.79	20	169.21	45	339.74	98	756.80	
13	Baroda ..	11	6.75	5	33.16	6	87.06	41	76.83	63	203.80	
14	Bulsar ..	1	0.70	2	13.01	..	..	23	30.50	26	44.30	
15	Sabarkantha ..	13	17.32	14	110.25	11	86.79	34	73.76	72	297.12	
16	Surat ..	8	26.77	5	23.23	2	24.30	62	77.46	77	151.76	
17	Surendranagar ..	2	0.95	7	111.47	8	87.47	103	229.34	120	429.23	
	Total ..	170	361.53	236	1,698.87	147	1,276.68	690	2,230.93	1,244	5,568.01 + 526.60 6,094.61	Check dams

APPENDIX A

BRIEF NOTE ON THE NARMADA PROJECT

(INCLUDING SALIENT FEATURES)

The Narmada Project as envisaged by Gujarat State with FRL 161.54 m. (530') and Canal offtaking with FSL 91.44 m. (300') will irrigate annually 29.66 lakh hectares (73.30 acres). Planned as a multipurpose project it envisages realisation of ¾ of the Narmad irrigation potential within a period of 30 years in an area which is severally affected by scarc and drought and in which inhabitants find it difficult to get even drinking water. The proje envisages reclamation and bringing under plough 4.45 lakh hectares (11 lakh acres) in th Banni and the Ranns. The areas to be reclaimed are located along or very close to the international border with Pakistan. Sturdy peasants will be settled in these areas to provide effective defence of the national frontiers as has been done in Rajasthan for the Bikaner Canal area and also in Israel by Kibbutz. The Project would meet, in no small measure, the deficit of the entire country in food and fibre.

The benefits and the costs of the poject are given below :—

A-Benefits

(I) Irrigation

(i) Gross command	51.10 lakh hectares (126.26 lakh acres)
(ii) Cultivable command	29.25 lakh hectares (72.28 lakh acres)
(iii) Annual irrigation ..	29.66 lakh hectares (73.30 lakh acres)

(II) Hydro power .

(i) Initial Stage ..	.. 1535 MW at 60 per cent L. F
(ii) Ultimate Stage ..	.. 1535 MW at 18.4 per cent L. F

(III) Flood control ..	. Partial
(VI) Navigation ..	.. Fullest possibilities kept in view

B-Costs

	(Rs. in crores)
(i) Cost of Unit-I Dam and appurtenant works ..	120.00
(ii) Cost of Unit-II Main Canal and Branches ..	419.00
(iii) Cost of Unit-III Hydro-Electric installation ..	139.70
	678.70

Cost per acre of C. C. A. ..	Rs. 607.00
Cost per Kilowatt installed ..	Rs. 1,290.00
Cost of power generation, kWhr.	
(i) Initial stage ..	1.79 Paise
(ii) Ultimate stage ..	2.64 Paise

Colossal loss of life and damage caused by the unprecedented floods of August, 1968 and ptember, 1970 have brought to the foremost, the urgency of implementation of this project at the liest. There is no remedy to check the progressive silting of the lower reaches of the river and revent flood damages except to provide a large storage at the terminal dam with adequate cushion. The Project is the only hope of survival to about 2 lakhs of souls inhabiting the of the river. The multipurpose project, one of the largest in the country, would in on, meet the growing demand of power in the entire western region.

APPENDIX A—*contd.*

The unit cost of all the benefits are among the lowest. The inter-State controversies have unfortunately delayed the commencement of the work of the project for nearly seven years. Its early implementation will usher in an area of prosperity for the entire western region, may the entire country.

The reclamation of large areas of the Banni and the Rann with the waters made available by this project will, besides large increase in food and fibre production (*vide* para 2.10.2) open up the possibility of an extensive afforestation programme by aerial seeding and enable the State to increase its forest over which, at present, is as low as 8.8 per cent (a large area out of which also consists of grass lands and lands under illicit cultivation) as against the requirement of 33 per cent as per the National Forest Policy.

Sardar Sarovar (Narmada) Project—(Gujarat State)

Salient Features

I. LOCATION

(1) State .. .. .. Gujarat

(2) District .. .. .. Broach

(3) Taluka .. .. .. Nandod

(4) River .. .. .. Narmada

(5) Site of Dam .. .. .. 5.63 kms. (3.5 miles) up-stream of Navagam village 120.70 kms. (75 miles) upstream of Broach city

(6) Longitude .. .. .. 73° 45′ E

(7) Latitude .. .. .. 21° 50′ N

II. STREAM FLOW DATA

(1) Width of the river Channel at dam site

(a) during high floods .. .. 487.7m. (1600 ft.)

(b) during summer .. .. 48.7 m. (160 ft.)

(2) Length of the river

(a) Source to dam site .. .. 1163.57 kms. (723 miles)

(b) Source to the sea .. .. 1311.64 kms. (815 miles)

(3) Average bed level of river at dam site RL 22.86 m. (RL 75 ft.)

(4) Average fall of river bed at dam site 1 in 2,000

(5) Maximum recorded flood on 6-9-70. 69.375 cumecs (24.5 lakh cusecs)

(6) Minimum recorded flow .. 8.5 cumecs (300 cusecs)

APPENDIX A—*contd.*

III. HYDROLOGY

(1) Water shed area of the river above dam site	88,000 kms. (33,970 sq. miles)
(2) Average annual rainfall in the catchment 1915 to 1962 (48 years)	121.4 cms. (47.82 inches)
(3) Annual runoff at the dam site at different percentages of reliability	
50 per cent	.. 43.25 milliard cu. m. (35.94 maft)
75 per cent	.. 35.56 milliard cu. m. (28.59 maft.)
90 per cent	27.76 milliard cu. m. (22 59 maft)
(4) Observed minimum dry weather flow (1951-52)	1 26 milliard cu m (1 0269 maft.)
(5) Moderated outgoing flood	0.34 lakh cumecs (12 lakh cusecs)

IV. RESERVOIR

(1) Full reservoir level (F. R. L.)	. 161.54 m. (530 ft.)
(2) Maximum water level (M. W. L.)	. 164 6 m (540 ft)
(3) Minimum draw down level (M D.D.L.)	121.92 m. (400 ft.)
(4) Normal tail water level (T.W L.)	.. 25 9 m (85 ft.)
(5) Gross storage capacity ..	. 27.73 milliard cu m (22.55 maft.)
(6) Dead storage capacity (below minimum draw down level)	5.17 milliard cu. m (4.23 maft)
(7) Live storage capacity ..	.. 22.56 milliard cu m. (18.32 maft.)
(8) Annual evaporation losses	1.47 milliard cu. m. (1.20 maft.)
(9) Submergence to F. R. L. 530	.. (gross) 1,33,016 hectares (3,28,678 acres)
(10) Length of reservoir ..	.. 241.4 kms. (150 miles)
(11) Maximum width of reservoir	.. 17.70 kms (11 miles)
(12) Average width of the reservoir	.. 5.50 kms. (3.42 miles)

V. DAM

(1) Type	.. Composite (rockfill dam in left flank and concrete dam for spillway power dam and head regulator)
(2) Length of main dam	. 1,792 m (5,880 ft.)

APPENDIX A—*contd.*

(3)	Maximum height	167 m. (549 ft.) (above deepest foundation level)
(4)	Spillway	Ogee shaped with roller/ski-jump bucket. Total length including piers is 503 m. (1,651 ft.) controlled by 26 nos. of radial gates of 15.54 m. × 14.02 m. (51′ × 46′)
(5)	Spillway capacity ..	0.56 lakh cumecs (20 lakh cusecs) at 164.6 m. (HFL 540) with 26 gates.
(6)	Particular of outlets of a canal or canals takingoff from the dam	Only one canal on right bank taken off from the saddle dam (canal bed power house). The maximum design capacity of the canal is 1218 cumecs. (43000 cusecs.)

VI. POWER INSTALLATION

		River bed Power house	Canal Power House
(*i*)	No. of units	10	9
(*ii*)	Rated capacity of each . ..	150 MW	75 MW
(*iii*)	Type of turbines	Francis vertical type	Kaplan
(*iv*)	Installed capacity	1500 MW	675 MW

VII. CANAL SYSTEM

(1)	F. S. L. at H. R.	91.5 m. (300 ft.)
(2)	Maximum design discharge ..	1218 cumecs (43000 cusecs.)
(3)	Main canal	
	(*a*) Length	499 kms. (310 miles)
	(*b*) Whether perennial, seasonal, or two sea-sonal	Perennial
	(*c*) Whether contour or ridge canal ..	Main canal is contour canal
	(*d*) Whether lined or unlined ..	Lined
(4)	Gross commanded area (G. C. A.) ..	51.10 lakh hectares (126.26 lakh acres)
(5)	Culturable commanded area (C.C.A.)..	29.25 lakh hectares (72.28 lakh acres)
(6)	Annual irrigation	29.66 lakh hectares (73.30 lakh acres)

VIII. DIRECT BENEFITS

(1)	Irrigation	Annual irrigation of 29 66 lakh hectares (73.30 lakh acres.)
(2)	Hydro power	
	(*i*) Initial stage . ..	1535 MW at 60 per cent L. F.
	(*ii*) Ultimate stage ..	1535 MW at 18.4 per cent L. F.
(3)	Flood control .	Partial
(4)	Navigation	Planning has been so envisaged that inland navigation would be possible in future through a system of locks and weirs/dams on Narmada river from Arabian Sea to the heart of Madhya Pradesh.

APPENDIX A—*concld.*

IX Cost-Estimates

	(Rs. in crores)
(1) Cost of Unit-I dam and appurtenant works ..	120.00
(2) Cost of Unit-II main canal and branches (exclusive of Mahi system) ..	419.00
(3) Cost of Unit-III Hydro-Electric installations ..	139.70
Total ..	678.70
(4) Cost debitable to the irrigation component of the project ..	458.60
(5) Cost debitable to the power component of the project ..	216.60
(6) Cost debitable to flood control ..	3.50
Total ..	678.70

X. Economic Appraisal

(A) *Irrigation*

	Rs.
(*i*) Cost of canal system per acre of	
(*a*) G. C. A. ..	348
(*b*) C. C. A. ..	607
(*c*) Annual Irrigation ..	539
(*ii*) Benefit cost ratio	
(*a*) @5 per cent annual cost ..	7.72
(*b*) @10 per cent annual cost ..	4.86
(*iii*) Percentage return on irrigation on the sum at charge (in the 5th year after completion)	11.10

(B) *Power*

	Paise/kwhr.
(*i*) Cost of power generation at bus	
(*a*) Stage I ..	1.79
(*b*) Stage II ..	1.31
(*c*) Stage III ..	2.64
(*ii*) Selling price of power ..	4.00
(*iii*) Percentage return on power component on the sum at charge (in the 3rd year after completion)	16.45

(C) *Flood Control*

Benefit cost ratio at 7½ per cent annual cost ..	4.68

Distribution of Outlay

	(Rs. in crores)
Fourth ..	15
Fifth ..	100
Sixth ..	130
Seventh ..	103.6
Subsequent Plans ..	455.5

APPENDIX B

ULTIMATE IRRIGATION POTENTIAL AND UTILISATION OF SURFACE WATER, REGIONWISE IN GUJARAT

1. Location

The State of Gujarat is situated on the west coast of India between 20° -2′ and 24°-40′ north latitudes and 68°-8′ and 74°-23′ east longitudes. On the west of Gujarat is Arabian Sea, on the north-west is the Gulf of Kutch, to the north lie the Little Rann of Kutch and the Marwar desert and to the north-east Abu. The east is guarded by rough forests, rugged in the north with side spurs of the Vindhyas, more open towards the Central natural highway from Baroda to Ratlam and southwards again rising and roughening into the northern off-shoots of the main range of the Satpura Hills.

2. Geographical divisions

From the point of view of its physical features Gujarat State can be divided into three regions viz. :—

(a) *Gujarat Region.*—Mainland extending from the Rann of Kutch and the Arvalli Hills on north to the river Damanganga on south. This region is almost of flat plain made up of alluvial soil on southern part and sandy portion on the northern part.

(b) *Saurashtra region.*—The hilly, peninsular region of Saurashtra is centrally elevated and generally sloping radially outwards.

(c) *Kutch region.*—The Kutch region comprises of the marshy lands of Little and Great Ranns of Kutch, flat plains of Banni area and a centrally situated ridge line running east-west through the Kutch area.

3. Areas and land utilisation

The total reporting area of Gujarat for land utilisation purpose is 1,87,115 sq. kms. (457.95 lakh acres). Out of this, an area of 97.46 hectares (240.83 lakh acres) *i. e.* over 52 per cent of the reporting area is cultivated. The cultivable area admeasures 123.81 lakh hectares (305.95 lakh acres) *i. e.* 66 per cent of the total reporting area.

The region-wise reporting area is as under :—

Sr. No.	Name of Region	Area In sq. kms.	Area In lakh acres
1	Gujarat Region	83,552	205.00
2	Saurashtra Region	59,360	145.00
3	Kutch Region	44,203	107.95
		1,87,115	457.95

4. Utility of water

Water is one of the most important basic resources in the world. Water is an inexhaustible resource. Without water no living things, plant or animal, can exist. It is required in abundance not only to quench our thirst and meet our domestic needs, but also in vastly greater quantities to produce and process the food we eat and other materials necessary for human welfare. Conservation and utilisation of water resources are inextricably bound up with the conservation and utilisation of the entire resource heritage of the region.

APPENDIX B—*contd.*

The task of building an expanding national economy is, to a large extent, dependent on the development and conservation of the nation's water and land resources. Both agricultural and industrial development can be achieved by multi-purpose development of river systems particularly for irrigation, flood control, power generation and navigation.

5. Surface water resources of Gujarat

Water resources of Gujarat State are extremely limited. The constructions of reservoirs across the Tapi and the Mahi are going on in full swing. Preliminary works on Dharoi storage project across Sabarmati have been started. Thus, having taken concrete steps to harness the major rivers, no substantial water resources except Narmada would be left for harnessing. The remaining rivers are small and the rainfall in those basins is low. Gujarat has yet another formidable handicap The vast alluvial plains of Gujarat do not offer suitable dam sites to enable economic exploitation of these resources, meagre as they are. Most of the medium and minor schemes feasible have been completed and a few remaining are planned in the Fourth and subsequent Plans. The statistics of the existing irrigation potential under all the multipurpose, major, medium and minor irrigation works, the total surface potential planned to be created by the end of the Fourth Plan and the ultimate potential considering all the feasible schemes other than Narmada are discussed in the subsequent paragraphs.

Surface water resources of the rivers of Gujarat can be considered under three distinct sub-heads, region-wise, as well as from the point of view of topography and rainfall, characteristics of the land traversed by them, namely :—

(a) Rivers of Gujarat region

(b) Rivers of Saurashtra region

(c) Rivers of Kutch region

The rivers of the Gujarat region are large in size and many of them are inter-State rivers. These large rivers emanate from the eastern high lands and the Sahyadri. In Saurashtra Peninsula, as the ridge line is almost in the centre, the rivers emerge radially and flow towards the sea or the Little Rann of Kutch. Similar is the case with the rivers of Kutch region. The rivers there flow towards the Great Rann of Kutch in the north or the Gulf of Kutch in the south. In view of these topographical limitations, the rivers in these two regions, namely, Saurashtra and Kutch are short in length and numerous in number.

Rainfall pattern

Average rainfall in the three region is as under :—

Sr. No.	Region	Average rainfall
1	Gujarat Region	Between 188 cms. and 68 cms. (75" to 25")
2	Saurashtra Region	Between 50 cms. and 38 cms. (25" to 15")
3	Kutch Region	Less than 38 cms. (below 15")

Generally in the regions of scarce rainfall, both the incidence and distribution of rainfall are highly erratic. North-west portion of Gujarat region, northern portion of Saurashtra region and Kutch region fall under this category. In contrast to these, in a region with heavy rainfall, the incidence and distribution of rainfall are uniform to a greater degree *i.e.* in southern part of Gujarat region. As a result, the crops failure are more frequent in a region of scarce rainfall.

APPENDIX B—*contd.*

6. *Rivers of Gujarat State*

Rivers of Gujarat region

Gujarat region stretches between Rel Basin in north and the Damanganga Basin in the south and has an area of 53,500 sq. kms. There are 17 river basins in this region. The five river basins, namely Rel, Banas, Saraswati, Rupen and Sabarmati cover 26,750 sq. kms. (10,311 sq. miles) in North Gujarat. River Rel disappears about 3.21 kms. (2 miles) downstream of Dhanera town in Banaskantha, Banas, Saraswati and Rupen drain in the Little Rann of Kutch. Sabarmati and Mahi rivers, which are amongst the major river basins of the State, drain into the Gulf of Cambay. The catchments of the basins of Rel, Banas, Saraswati and Mahi stretch into the neighbouring State of Rajasthan.

A small portion of the Mahi basin lies in Madhya Pradesh. The two largest rivers of Gujarat State *viz.* Narmada and Tapi are inter-State rivers, with origin in Vindhya mountain ranges and Satpura Mountain ranges of Central India respectively. The total catchment area of basin and the area falling in Gujarat State are given below :—

TABLE 1

Name of the river	Total catchment area in sq. kms. (sq. miles)	Catchment area in Gujarat State in sq. kms. (sq. miles)
Narmada	98,795 (38,145)	11,398 (4,401)
Tapi	64,302 (24,827)	2,595 (1,002)

All the remaining nine rivers are west flowing coastal rivers and empty into the Arabian Sea.

On account of very high rainfall in southern part of Gujarat region the average yield of the rivers south of Tapi is as high as over 1.1 million cu. m./sq. km. (100 mcft./sq. mile) of catchment area as against about 0.22 millian cu. m./sq. km. (20 mcft. / sq. mile) of catchment area of North Gujarat rivers.

Rivers of Saurashtra region

The Saurashtra Peninsula is bounded by the Gulf of Kutch and Little Rann of Kutch in the north and Arabian Sea in the west. The Gulf of Cambay lies on its south and-south-east. The ridge line is almost at the centre of this region with the Gir mountains protruding towards the south-west a little and a host of rivers, big and small, flow radially towards the coasts. There are as many as 71 rivers in this region. The Shetrunji and the Bhadar are the largest river basins of this region. The rainfall in this region is about 50 cm. (20 inches) and hence water resources potential has been assessed at 60 per cent reliability.

Rivers of Kutch region

The major ridge line in this region stretches almost east to west in the main land. It is bounded by the Great Rann of Kutch in the north and the Little Rann of Kutch in east. The Arabian Sea and the Gulf of Kutch constitute the western and southern borders. All the rivers generally flow towards the Great Rann of Kutch in the north or towards the Gulf of Kutch in the south. A few rivers flowing towards the west empty into the Arabian Sea, while a few others flowing towards the east and the south-east disappear in the Little Rann of Kutch. There are some 97 small rivers and rivulets in this region including those in the islands of Pachham and Khadir in Great Rann of Kutch. The average rainfall in this region is as low as 32 cms. (13 inches) and hence water resources potential has been assessed at 50 per cent reliability.

7. Available total surface water resources and irrigation potential

The available total surface water resources of the Gujarat State, excluding the Narmada basin, and considering the different reliabilities for yields in different regions depending upon the average rainfall pattern in different regions have been estimated at 46.9 m. cu. m. (38 maft.) as indicated below :—

TABLE 2

Sr. No	Region	Total catchment area of the basin in sq. kms. (sq miles)	Dependable annual yield in m cu. m. (maft)	Reliability Per cent	Ultimate surface water utilisation in m. cu. m. (maft.)
1	2	3	4	5	6
1	Gujarat region, excluding Narmada	1,70,504 (65,832)	39.96 (32 4)	75	12 88 (10 450)
2	Saurashtra region . .	6,086 (2,350)	4.55 (3.69)	60	2.08 (1 686)
3	Kutch region .	44,263 (17,090)	2 43 (1 97)	50	0.4 (0 326)
	Total		46.94 (38 06)		15.36 (12.462)
		Say,	46 90 (38 00)	Say,	15 36 (12 46)

Out of the total surface water resources of 46.9 m.cu.m. (38.0 maft.) excluding Narmada, nearly 53 per cent of resources are from the inter-State rivers namely Sabarmati, Mahi and Tapi. Only limited quantities of water can be available to Gujarat from these rivers. Lack of reservoir sites due to flat nature of the terrain area and non-availability of suitable foundations has been the principal handicap in harnessing the available surface waters. Less than one third of the available supplies can be harnessed and put to irrigation use as can be seen from the above table 2. Statement I at the end of this Appendix shows ultimate irrigation potential that can be created in the State from the available surface water resources through multipurpose, major, medium and minor irrigation schemes (excluding Narmada). It also shows the ultimate surface water utilisation regionwise in the Gujarat State excluding Narmada.

The abstract of the total surface water resources and ultimate utilisation regionwise is given in table 2 above. The abstract of the ultimate irrigation potential regionwise is given in Table 3 below :—

TABLE 3

Sr. No.	Name of Region	Total reporting area in lakh hectares (lakh acres)	Total ultimate irrigation potential in lakh hectares (lakh acres)
	Gujarat Region	82.96 (205.00)	13.83 (34.20)
	Saurashtra Region	58 67 (145.00)	2.69 (6.663)
	Kutch Region	43 07 (107.95)	0.6 (1.504)
		184.70 (457.95)	17.12 (42.367)
		Say,	(

APPENDIX B—*concld.*

It is seen from tables 2 and 3 that ultimate gross utilisation necessary for irrigating the ultimate potential of 17.12 lakh hectares (42.37 lakh acres) is 15.36 m. cu.m. (12.46 maft.). The cultivable areas of Gujarat State admeasures 123.83 lakh hectares (305.75 lakh acres) *i. e.* 66 per cent of the total reporting area of 184.7 lakh hectares (457.95 lakh acres). Therefore, in the ultimate stage, irrigation potential that can be created by surface water resources will be 13.88 per cent of the cultivable area.

Thus, it is pertinent to note that though water resources of 46.9 m. cu. m. (38.0 maft.) (excluding Narmada) are available in the State, total ultimate utilisation will not exceed 15.36 m. cu. m. (12.46 maft.). This is only 33 per cent of the available surface water resources. This handicap is mainly due to paucity of reservoir sites in the alluvial plains of Gujarat.

8. The ultimate irrigation potential which has been worked out above is again subject to following limitations :—

(*i*) If quantum of water available to Gujarat gets reduced owing to larger consumptive use in upper States for inter-State rivers, there would be reduction in irrigation potential.

(*ii*) Economic-feasibility of various schemes proposed is yet to be established after carrying out necessary exploration and investigations. It is likely that some of the schemes, which may not work out to be economically feasible after detailed cost-estimates are prepared, may have to be dropped.

(*iii*) Water requirement for industrial and domestic purposes, which is estimated at about 2.466 m. cu. m. (2 maft.) also largely draw upon the surface water resources and will make a sizeable dent into the limited available surface water resources meant for irrigation.

9. The State's endeavour to create irrigation potential by harnessing available surface water resources through technically feasible irrigation schemes has been on the increase since the advent of the planning era. The following table shows the endeavour in a nutshell :—

Sr. No.	Description	*Irrigation potential in lakh hectares (lakh acres) under major, medium and minor irrigation schemes*	*Surface water utilisation in m.cu.m. (maft.)*
1	By the end of March, 1969	5.46 (12.96)	4.44 (3.61)
2	Potential during the Fourth Plan	4.88 (12.08)	4.43 (3.60)
3	Total at the end of Fourth Plan	10.30 (25.04)	8.67 (7.21)
4	Total ultimate stage	17.12 (42.37)	15.36 (12.46)

By the end of March, 1969, an irrigation potential of 5.46 lakh hectars (12.96 lakh acres) was created which can consume 4.44 m. cu. m. (3.61 maft.) of surface water. It is proposed to create 4.88 lakh hectares (12.08 lakh acres) of additional irrigation potential in the Fourth Plan from the multipurpose, major, medium and minor irrigation schemes (excluding Narmada Project) to consume further 4.43 m. cu. m. (3.60 maft.) of surface water resources. Thus, at the end of Fourth Plan, surface water resources to the tune of 8.67 m. cu. m. (7.21 maft.) (58 per cent of the available ultimate utilisation of 15.36 m. cu. m. or 12.46 maft.) will be harnessed through all categories of irrigation schemes (except Narmada Project) to cater for 10.13 lakh hectares (25.04 lakh acres) of potential (59 per cent of the ultimate potential of 17.12 lakh hectares or 42.37 lakh acres).

STATEMENT I

Statement showing regionwise irrigation potential and utilisation of surface water at the end of March, 1969 at the end of Fourth Plan and at ultimate stage (excluding Narmada) in Gujarat State

Sr. No.	Region	Irrigation potential in lakh hectares (lakh acres)				Irrigation utilisation in m. cu m. (maft.)				Remarks
		At the end of March, 1969	During Fourth Plan	Total at the end of Fourth Plan	Total in ultimate stage	At the end of March, 1969	During Fourth Plan	Total at the end of Fourth Plan	Total in ultimate stage	
1	2	3	4	5	6	7	8	9	10	11
1	GUJARAT REGION									
	Area—82 96 lakh hectares (205 0 lakh acres)									
	(1) Major and medium schemes.	3 01 (7.53)	3 82 (9.45)	6 87 (16.98)	12 64 (31 25)	2 83 (2 300)	3 63 (3 000)	6 53 (5 300)	12.16 (9 860)	
	(b) Minor schemes	0 37 (0 93)	0 49 (1.22)	0 87 (2 15)	1.19 (2 95)	0 22 (0 186)	0 31 (0 244)	0 53 (0 430)	0 72 (0 589)	
	Total	3.41 (8 46)	4 31 (10 67)	7 74 (19.13)	13 83 (34 20)	3 05 (2 456)	4 03 (3 244)	7 06 (5 730)	12 83 (10 449) Say, 10 45%	
2	SAURASHTRA REGION									
	Area—58 67 lakh hectares (145 0 lakh acres)									
	(a) Major and medium schemes	1 11 (2.75)	0 22 (0 538)	1 33 (3.309)	1 85 (4.580)	0 93 (0.760)	0 22 (0.182)	1 15 (0 942)	1 57 (1.270)	
	(b) Minor schemes	0 26 (0 65)	0 26 (0 649)	0 62 (1.299)	0 84 (2.083)	0 15 (0 129)	0 15 (0 130)	0.31 (0 259)	0 52 (0.416)	
	Total	1.37 (3 40)	0.48 (1.207)	1 95 (4.607)	2 69 (6 663)	1 08 (0 889)	0 37 (0 312)	1 46 (1.201)	2 09 (1 686)	
3	KUTCH REGION									
	Area—43 07 lakh hectares (107.95 acres)									
	(a) Major and medium schemes.	0 10 (0 262)	0.016 (0 04)	0 12 (0 302)	0 16 (0 397)	0 08 (0 068)	0 01 (0 01)	0.09 (0 078)	0 12 (0.103)	
	(b) Minor schemes ..	0 34 (0 843)	0 06 (0 165)	0 4 (1 008)	0 44 (1 107)	0.2 (0.169)	0.04 (0 033)	0 21 (0 201)	0 27 (0 223)	
	Total	0 44 (1.105)	0 07 (0 205)	0 52 (1.310)	0 60 (1 504)	0.28 (0 236)	0 05 (0 043)	0 23 (0 279)	0 39 (0 326)	
	Grand Total (1+2+3)	5 22 (12 905)	4 88 (12 082)	10 21 (25.047)	17 11 (42 367)	4 35 (3 611)	4 45 (3 589)	8.73 (7 210)	15 36 (12.461)	
		Say, 17 12 lakh hectares (42.31 lakh acres)				Say, 15 36 m. cu m. (12 46 Maft)				

APPENDIX C

NOTE ON SOIL SURVEY AND DRAINAGE IN GUJARAT STATE

1. Irrigation

Out of the major irrigation schemes in the State, the Mahi and Kakrapar weir schemes can assure water for irrigation during two seasons *viz.* Kharif and Rabi only. The irrigation under these two schemes has been started since 1958-59. The *Shetrunji Project* is a reservoir scheme ; but the replenishment so far has not exceeded 75 per cent of the capacity of the dam, resulting in two seasonal irrigation (kharif and rabi) only. Irrigation under this project has been started since 1963-64.

In Gujarat region, medium projects like Meshwa, Hathmati, Fatehwadi, Khari-cut and others have been constructed during the First and Second Five Year Plan periods. The Fatehwadi is an inundation scheme and irrigation is on the run of the river, *i. e.* up to the end of rabi season only. In the case of storage projects due to the low and erratic rainfall in the catchment areas perennial irrigation on large scale has not been possible. In Saurashtra region, a large number of rivers have been harnessed during the last three Five Year Plan periods. The rivers being small and ephemeral in character, the storage created is limited and hence these projects can provide irrigation primarily in two seasons of Kharif and Rabi only. The perennial irrigation in this region of the State is, therefore, limited to a small percentage of the commanded areas.

2. Soils

Physically the State can be divided into four distinct regions :—

(*i*) Hilly tract with un-even topography in the north-east and east comprising parts of Satpura, Vindhya and Gujarat Malwa hill ranges.

(*ii*) Stretch of alluvial lands extending from the Abu hills to river Damanganga in the south.

(*iii*) Peninsular region of Saurashtra, and

(*iv*) Semi-arid tract of Kutch.

The soils in the Gujarat Region have their origin from the rocks laying on the eastern fringe. In the southern portion comprising Surat and Bulsar districts, they are formed from the deposits brought down by the rivers like Tapi, Mindhola, Purna, etc. up to Damanganga, flowing from east to west. These soils are derived from the Deccan trap and hence are heavy and are known as 'deep black' (Ragur) type. The deposits of alluvium have depth ranging from a few metre in the eastern portion to hundreds of metres near the sea coast.

From the south to north, the soils are formed from series of various types of rocks such as trap, metamorphic rocks like phyllites, schists, Shales and Gneiss, granite etc. The soil texture, therefore, varies from heavy and argillaceous in the south, becoming medium to coarse and very coarse towards the north. Consequently, in the order of the parent rock, the clay content in soils goes on decreasing from the southern districts of Broach, Baroda, Panchmahals to Kaira and Ahmedabad, in the centre of the State, to very low in northern districts of Mehsana and Banaskantha, where the soils are sandy and porous.

In Saurashtra region, the parent rock is the Deccan trap over a major portion and hence the residual soils formed from this rock have shallow to medium depth (from a few cms. to 2.4 m. or from a few inches to 8 feet) and are underlain by porous murrum substratum. The soils range from coarse texture on the slope of the hills to clay loams or clays towards valleys.

In Kutch region, the soils in a major area are derived from sandstones and limestones and hence are coarser in texture (sandy loam to loamy sand), with satisfactory internal drainage. The soils are residual and are underlain by permeable murrum (disintegrated rock) substratum.

APPENDIX C—*contd*

3. Drainage problems

As already explained earlier, majority of the areas under the commands of the river valley projects in the Gujarat State are under non-perennial irrigation and hence the problems of water logging and/or salinity have not been severe in any parts of the State so far.

The pre-irrigation soil surveys of the areas under the commands of all the irrigation projects are being carried out systematically. Such pre-irrigation surveys in the three major projects, *viz.*, Shetrunji, Mahi and Kakrapar, have brought out that the lands under the lowest irrigability land class need protection through drainage. A short description of each of them is given below —

(i) *Shetrunji Project.*—In the south-west of the right bank canal command, "Detha area", comprising gross area of about 6,313 hectares (15,600 acres) was found to be affected by water logging and salt efflorescence under pre-irrigation conditions. Protective measures through surface and sub-surface drains to remove water-logging were, therefore, essential before catering irrigation to these areas. Accordingly, detailed soil and topographical surveys were undertaken during 1963-64. The investigations revealed that out of the 6313 hectares (15,600 acres) the areas affected in three different basins were as follows :—

TABLE

Basin No	Area damaged			Approximate gross catchment area hectares (acres)
	Water logged hectares (acres)	Salt affected hectares (acres)	Total hectares (acres)	
I	324 (800)	567 (1,400)	890 (2,200)	2185 (5,400)
II	146 (360)	607 (1,500)	753 (1,860)	1214 (3,000)
III	210 (520)	162 (400)	372 (920)	2914 (7,200)
Total .	680 (1,680)	1336 (3,300)	2015 (4,980)	6313 (15,600)

The drainage scheme comprising the main and subsidiary drains, pipe drains, etc. was executed during 1965 after taking into consideration the land slopes, K/A Values [illegible] of permeability), and the depth of the permeable substratum. The effect of the drainage [illegible] immediately visual on the sub-soil water table. The drains started functioning [illegible] after the construction of drainage system. The observations made in the [illegible] also indicated that the sub-soil water levels fall below 2.4 m. (8 feet) from [illegible] month of December every year. The salinity in soils has been [illegible] successful cropping has been possible in these areas since 1965 [illegible] Canal Irrigation has been possible in this area since [illegible] of leaching through flow irrigation well be visible in the near [illegible] connection is being undertaken.

(ii) *Mahi Right Bank Canal Project.*— The [illegible] west of the Alang channel have heavy soils [illegible] [illegible]ming poor towards the Gulf of Cambay. [illegible] [illegible] 6 feet) are, however, [illegible] [illegible]otected through surface drainage [illegible] [illegible]g after irrigation. Under the [illegible]

APPENDIX C—*contd.*

wheat on the residual moisture without irrigation. It is proposed to carry out soil and topographical investigations in these areas for laying out a systematic drainage scheme. The World Bank Team had also visited these areas and examined the possibilities of providing the drainage facilities. It is proposed to allocate a sum of Rs. 3.00 crores for detailed investigations and constructions of drains in the area under the Mahi command. The surveys and investigations for these areas are underway.

With the construction of Kadana Reservoir (1971-75) the irrigation under the Mahi Project is likely to be firmed up through a perennial canal. This will facilitate to have some of the areas 10,000 hectares (25,000 acres) under heavy perennials also. Under such conditions protective measures are proposed to be taken by remodelling the existing drains as well as constructing additional drains as may be necessary.

(*iii*) *Kakrapar Project.*— The soils in the Kakrapar command have their origin from Deccan trap and hence, are heavy. However, they are impregnated with calcium carbonate contents in the surface and sub-surface layers. The soils in the lower layers in these areas, are coarser in texture. The area under the Kakrapar command is traversed by many rivers like Kim, Tapi, Nindhola, Purna, Ambica and Par, alongwith their tributaries, which form satisfactory natural drainage. The Eastern portion has undulating topography with low-altitude hills.These areas, which have generally medium to medium deep soils 1.2 to 2.4 m. (4′ to 8′) need very meagre drainage measures, wherever local problems may arise.

The soils go on becoming deeper and flatter towards west and would require more and more protective measures through artificial surface and sub-surface drainage. As far as natural drainage is concerned the area under Kakrapar Project can be divided into 3 zones.

Zone No. 1.— The area under this zone having satisfactory slopes may need clearing of existing 'nalas' and other natural drain lines with few artificial drains, where intensive cropping is desired. This will primarily include the perennial crop zones like those under sugarcane and Bananas.

Zone No. 2.— The major areas under this zone are likely to be brought under perennial, light perennial and two seasonal irrigation. They are comparatively flatter, with deeper soils. The natural drain lines such as streams and nalas may not be adequate to take care of the whole catchment in these areas. The lands under this zone, therefore, would require correct spacing of drains at adequate intervals, besides cleaning of natural drains and their maintenance.

Zone No. 3.— This area is further sub-divided into two zones. The one in the Eastern portion which would cover about 3/4th of this zone has flat gradients, heavy soils impregnated with more percentage of silt and are deep. Proper care to investigate the drainability characteristics of soils in this region is, therefore, necessary. The artificial drainage in such areas would be required at more frequent and closer intervals.

The Western most part of this zone has very flat gradients merging into the sea-cost. The lands are many times under the influence of tidal fluctuations, and hence, the sub-soil water table is saline and unsuitable for irrigation. In the coastal region, the lands have been protected by coastal bunds against ingress of tidal water at many places. The soils being heavy and silt-laden with very flat gradient, will have to be protected not only through well laid out open drains, but also with subsurface drainage, such as tile drains, etc. Intensive soil and sub-soil surveys will have to be undertaken in these areas to locate the drain spacings, out-fall conditions and so on. Some stray cases of water logging and/or salinity were reported since 1961, and timely remedial measures for these were taken. The cause of water logging was primarily the drainage congestion and silting up of existing streams. After the remedial measures were taken, the lands were found to be improved and could be brought under normal crop cultivation.

APPENDIX C—*contd.*

In the Olpad taluka, damage to lands due to soil moistening was reported. Investigations indicate that the cause was the silting up of the existing drains and inadequate land drainage. The existing drains were, therefore, desilted, with the result that the excessive moisture in the soils was found to be reduced considerably and the crops could be grown satisfactorily. A scheme for field drains is proposed and is being executed, by the Agriculture Department under area development programme.

Lately, a few cases of salinity in soils such as near villages Dungar and Varad in Kakrapar Command were reported. Investigations showed that although the water table at these spots was low, the salts accumulated in the surface soils, duly collected from surrounding high lying areas, where sugarcane was the main crop. The damage has been ascertained to be due to silting of existing drain and keeping the land either fallow or not irrigated during the last decade. The measures for such a problem are being undertaken by clearing the existing drain and constructing additional lateral, if required.

(ii) *Bhogavo Irrigation Scheme.*— High water table, coupled with high salinity in soils were reported in Bhogavo Irrigation Scheme near Surendranagar. Detailed soil investigations were made and six main drains have been executed to cut through the existing rock barrier and clearing the natural sub-surface drainage. This is expected to lower the elevated water-table, in the affected area. The salts in the soil can be subsequently leached out through adequate irrigation and constructing additional lateral drains as required. The further study is underway.

4.0 Measures adopted

4.1 Preventive measures

The following preventive measures have been adopted [illegible]

(i) *Subsoil water level observations.*— [illegible] Mahi Right Bank Canal and Kakrapar Project [illegible] twice a year (April-May and [illegible]) [illegible] the first irrigation. The open wells [illegible] (½ mile square) and water samples are collected [illegible] Yearly reports giving [illegible] are enumerated. [illegible] irrigation.

(ii) [illegible]

(iii) [illegible]

(iv) [illegible]

APPENDIX C—*concld.*

crop suitability and the availability of irrigation water. The primary factor in designing the crop pattern is the capacity of soils to sustain various intensities of irrigation, so as not to affect the soils adversely.

4.2 Curative measures

(*a*) *Surface and sub-surface drainage.*—The pre-irrigation soil surveys enable to locate the areas likely to be affected after introduction of irrigation. Such areas are further investigated in details and measures such as surface and sub-surface drainage are adopted, e. g. Detha drainage scheme in Shetrunji Project, surface and sub-surface drains in Cambay-Matar area of Mahi Project, the drainage system in Bhogavo Project, etc.

(*b*) *Desilting of existing nalas.*—In the Kakrapar command blocking of existing drains was observed in a few places in the Surat Canal command. The desilting of the existing drains could improve the soil conditions by the lowering of sub-soil water table.

(*c*) *Pumping of sub-soil water.*—A survey has been carried out in Mahi Right Bank Canal Project for locating shallow tubewells in the areas likely to be left out, being above canal F. S. L. Each of such areas will be provided with a shallow tubewell through which sub-soil water will be pumped to irrigate the areas. This will help in controlling the rise in sub-soil water table.

It is also proposed that in the areas having high rate of rise in water table, irrigation through canals will be provided during kharif and rabi seasons only. In the summer, the water will be drawn through existing wells to keep down the sub-soil water.

This method is proposed to be adopted in the Kakrapar area.

(*d*) *The lining of canals.*— To prevent seepage from the distributory system, particularly in sandy areas of Dantiwada Canal and also in fissured spots in rocky areas of Saurashtra as in case like Shetrunji Project canal lining has been done. Such measures can be adopted wherever problems due to seepage from canals are reported.

5. General

In Gujarat State the Irrigation wing of the Public Works Department is undertaking pre-irrigation soil surveys, surveys for drainage in the irrigated areas, survey for 'X' limits and so on in the commanded areas of irrigation projects. The problems of drainage has not been severe so far excepting a few localised cases, which have been timely remedied. However, planning for measures to be taken in the areas likely to be affected after the introduction of perennial irrigation, has been undertaken, well in advance, and investigations are underway.

A drainage Division with 4 sub-divisions has been submitted for Mahi Project while the proposal for a drainage Division with 6 sub-divisions for Kakrapar Project is under scrutiny at Government level. The problem of irrigated agriculture under these two major projects can, therefore, be handled by these divisions independently and timely measures can be adopted as may be required.

APPENDIX D

DESALINATION

1. Introduction

1.1 Since time immemorial, nature is carriying out the process of water desalination. Ocean water, due to the solar heating, converts into vapour and pours down on the earth in the form of fresh water. Water is the most essential component of every day life. Owing to the rapid expansion of population accompanied by the accelerated industrial growth, serious water shortages are being felt in certain parts of the world since the last few years and thus water has attracted considerable attention. Water is becoming insufficient eventhough attempts have been made for fuller utilisation of the available natural water resources and it has become necessary to adopt different desalination techniques to convert saline water from different sources including sea water into good quality water.

1.2 In India, it is known that all the natural water resources have not been fully exploited. But due to vastness of the country and variety of climate existing in different regions, the problems of water scarcity exists in certain parts of the country like Rajasthan, Gujarat etc. In Gujarat scarcity of water in arid regions like Kutch, Saurashtra and other coastal places needs careful attention to adopt different desalination techniques.

1.3 Ordinary sea water has an average salt content of 35,000 ppm. Brackish water is strictly defined as any water with less dissolved salts than sea water and the term is usually applied to water containing more than 500 ppm. which is generally considered the maximum level for human consumption. There are, however, many communities in the world that are using well-waters with salt exceeding 1500 ppm. with no ill effect. For agricultural purposes a salt content of 11,000 ppm. is considered the maximum possible, although some crops require a much higher standard and a few can be grown successfully with a more saline water. Specifications for industrial processes vary over a wide range.

1.4 The desalination involves the reduction of salt content of sea water or brackish water to render it suitable for domestic, industrial or other specified purposes. The principle of desalination which has been known and practiced on a small scale by mankind for thousands of years, has received a keen attention during the recent developments.

2. Types of Desalination Techniques

2.1 Desalination process may be defined according to the type of energy employed. Thermal energy is used for some processes including most of the distillation techniques, other require either electrical or mechanical energy. They may be classified according to the type of source of water to which they are applicable. Those in which energy consumption is not influenced appreciably by salinity may be used for treatment of water of any salt content including sea water.

2.2 All the desalination processes fall into two broad classes; (a) the techniques in which water is separated from aqueous solution of salts, *i e*, freezing, etc. and (b) the techniques in which salt is removed from the aqueous solution to obtain fresh water *i. e.* ion-exchange and electrodialysis etc. Some of the important techniques of desalination are (1) solar stills (2) humidification dehumidification (3) multieffect evaporation (4) multistage flash evaporation (5) vapour compression (6) freezing (7) reverse osmosis (8) ion-exchange (9) electrodialysis (10) solvent extraction and (11) hydrateprocess.

2.3 As a part of programme of solar energy utilisation, some laboratory [illegible] conducted by National Physical Laboratory (NPL), New Delhi on solar [illegible] from N. P. L., the Defence Laboratory at Jodhpur also did some [illegible] same technique to meet defence requirements and now that laboratory [illegible] tory studies on electrodialysis and some other techniques. But at [illegible] the field of desalination are in C. S. M. C. R. I. (Central Salt and [illegible]

APPENDIX D—*contd.*

Institute) Bhavnagar, and with the applicability of nuclear energy for desalination, B. A. R. C. (Bhabha Atomic Research Centre) at Trombay. They are going ahead with the studies on high capacity nuclear desalination plants and they are also kneenly interested in reducing the cost of product water by manufacturing the valuable by-product chemicals from the effluent brine of the desalination plants. This institution is carrying out the studies on the feasibility of integration of marine chemicals manufacture in the proposed project of agro-industrial complexes around the plants on Saurashtra-Kutch coast.

2.4. Work on desalination has been undertaken in the Central Salt and Marine Chemicals Research Institute, Bhavnagar and the technique of Solar stills, H. D. and electrodialysis have been developed. Development work on reverse osmosis, one of the most promising methods of desalination has been taken up in early 1968. Studies on preparation of membrance, both flat and tubular,are in progress. Fluerates between 400 litres $m^2 \times$day (about 8 gallons/$ft^2 \times$ day) to 1,000 litres $m^2 \times$ day (about 20 gallons/ft/day) with 85 per cent salt ejection have been obtained. Units using flat and tubular membrances fitted in suitable modules with the capacity of 2,500 to 5,000 litres/day (500 to 1,000 gallons/day) are under trials.

2.5 Exploratory studies on other desalination techniqeus are in progress. These techniques include freezing and various aspects of basic research. Basic chemical engineering design studies on heat transfer are also undertaken.

2.6 It can be seen that the techniques being developed in the Institute at Bhavnagar are capable of giving a solution to the immediate problems of water supply. The techniques can treat brackish water or sea water and can be used to meet the water requirements which can be classified as follows :—

(*i*) *Small scale requirements*

For smaller communities and isolated groups and defence purposes with capacities ranging from a few hundred litres to a few thousand litres per day.

(*ii*) *Medium scale requirements*

For industries, sea going vessels and supplementary water supplies in urban areas upto capacity of 20,000 m^3/day (5 mgd) ;

(*iii*) *Large scale requirements*

For big cities and agricultural purposes with capacities more than 20,000 m^3/day.

3. Economics

3.1 General

3.1.1 Development of large scale plants is always preferred to dual purpose nuclear plants and thus that problem falls within the perview of B.A.R.C., Trombay and the Bhavnagar Institute will share with the B. A. R. C. Recently, as advised by the B. A. R. C., the Institute has prepared a feasibility report on integrating of marine chemicals manufacture in the agro-industrial complex around the proposed nuclear power-*cum*-water desalination 680 million litres (150 million gallons) capacity plant on Kutch-Saurashtra coast.

3.1.2 Details of the approximate cost estimation of different capacties a desalination plants by reverse osmosis technique and electrodialysis technique based on the results of the pilot plants conducted at C. S. M. C. R. I., Bhavnagar are enclosed at Tables 1 and 2. It can be seen that the cost of production of 1,000 litres /gallons works out to be Rs. 1.25/6.10 having salinity of produce water of 600-800 ppm I. D. S. in case of reverse osmosis technique where as it works

APPENDIX D—*contd.*

out to be Rs. 1.30 /6 40 having salinity of produce water of 1,000 ppm. If the capacity plant is 45,460 litres (10,000 gallons/day) If the capacity of the plant is 45, 4,60 litr (1 lakh gallons/day), the cost of the product water per 1,000 litres (1,000 gallons) w Re. 1 (Rs. 4 70).

3.1 3 The Director, Engineering Research Institute, Baroda has installed Solar Still P on the terrace of the Institute for a capacity of 100 litres of distilled water per day The pla is installed as per the design supplied by the Central Salt and Marine Chemical Research Ins tute, Bhavnagar It caters the need of distilled water required for all the laboratories as we as number of vehicles in this Institute. The product cost of distilled water per litre comes to paise with 50 per cent efficiency and 3ps. with 100 per cent efficiency against the product cost of about 35 ps. per litre with 50 per cent efficiency by the electric still It is experienced that there are innumerable other difficulties in running the electric still as it requires constant attention As such it could be run only during office hours thus limiting the total production of distilled water

Irrigation

3 2. For irrigation purpose, we may consider the example of wheat The wheat will require about 0.6m (2') depth of water for the whole season The total litres (gallons) required for one hectare (acre) of wheat would, therefore, be 60,00,000 (5,44,500) The cost of 60,00,000 litres (5,44,500 gallons) for wheat at a rate of Rs 1 25 (Rs. 6 40)per 1,000 litres gallons will be Rs. 7,500 (Rs. 3,485) against the water rate of Rs 30 (Rs 40) per hectare (acre) by flow irrigation if the capacity of the plant is 45,460 litres (10,000 g) per day. If the capacity of the desalination plant is 4,54,600 lakh gallons per day litres the rate of product water will be reduced to Re. 1 (Re. 4 70) per 1,000 litres (gallons) The cost of water per hectare (acre) of wheat would work out to Rs 6,000 (Rs 2,569) The experiments for reducing the cost of product water is going on at C S M C. R. I, Bhavnagar by installing a bigger plant of 680 m.l d (150 m g d) and by manufacturing the valuable byproduct chemicals from the effluant.

Water Supply

3.3 The rates of water for water supply in different municipalities vary from 20 paise to 50 paise per 1,000 litres The rate for supplying water to municipalities from Government tubewell is 5 paise per 1,000 litres; while the supply rate for group of villages in Banni area in Kutch district for piped water supply scheme works out to Rs 1.6 to Rs. 2 0 per 1,000 litres and that for villages in Banaskantha district works out to 50 paise per 1,000 litres

4. Conclusions

Looking to the researches on desalination which are being carried out at various institutions, it may be expected that the cost of product water may compete with the rate of water from the Government tubewells as well as various municipalities. It may also be possible to use the product water in the water supply in the arid regions like Kutch, Saurashtra coastal areas etc. where there is acute shortage of potable water because of very scanty rainfall, while the chances of development of irrigation with product water appear to be bleak and unwarranted in near future

TABLE 1

Approximate cost estimation of different capacities desalination plants by reverse osmosis technique

Feed water	5,000 ppm T.D.S.
Feed to product ratio	4 : 3
Operating pressure	[illegible]
Product water	[illegible] ppm TDS

APPENDIX D—*concld*

TABLE 2

Cost calculation with details of electrodialysis plant treating different salinity waters

Product Water Salinity : 1,000 ppm
Capacity 25,000 Litres/day

Feed Water Salinity ppm	No. of stacks	No of rectifiers	Capital cost Rs		Power/1000 kwhr	Amortization per 1,000 litres			Total cost of product water Rs.	
			Equipment	Membrances		Equipment	Membrances	Labour	per 1000 Litres	per 1000 gal
1	2	3	4	5	6	7	8	9	10	11
				(1) PVC membrances						
10,000	6	3	75,000	12,600	18.2	0.75	0.56	0.60	3.73	16.93
8,000	5	3	65,000	10,500	15.0	0.65	0.47	0.60	3.22	14.62
6,000	4	2	50,000	8,400	11.0	0.50	0.37	0.60	2.57	11.67
4,000	3	2	40,000	6,300	6.4	0.40	0.28	0.60	1.92	8.72
2,000	2	1	25,000	4,200	2.2	0.25	0.19	0.60	1.26	5.92
				(2) Interpolymer membrances						
10,000	2	2	30,000	10,000	10.0	0.30	0.44	0.80*	2.34	10.63
6,000	1	1	15,000	5,000	5.6	0.15	0.22	0.60	1.53	6.91
5,000	1	1	15,000	5,000	4.4*	0.15	0.22	0.60	1.41	6.40
3,000	1	1	15,000	5,000	3.2	0.15	0.22	0.60	1.19	5.40
2,500	1	1	15,000	5,000	1.6	0.15	0.22	0.60	1.13	5.13

Amortization (a) On capital equipment : 7.5 per cent (20 years life) Cost of one rectifier : Rs. 5 000
(b) On membrances 33.3 per cent (life 3 years) Cost of one stack : Rs 10,000.

Labour Rs 5 per shift.
Per day 3×5=Rs 15
Power at 10 paise /kwhr.

*Power requirement for 1,000 litres of product water using rubber based membrance is 17.8 kwhr as against 8.4 kwhr, for PVC and interpolymer membrances respectively.

APPENDIX E

STATUS OF WATER RATES AND COMPARISON WITH RATES IN OTHER STATES

Water rates for flow irrigation and lift irrigation from canals and notified sources for agricultural purposes.

Schedule of Water Rates

The structure of water rates in force with effect from 15th June 1971 up to 14th June 1974.

Sr. No.	Name of Season or crop and other details	Rate per hectare (per acre)
A.	**Kharif Season :**	
1	Short term paddy	Rs. 59.30 (Rs. 24.00).
2	Long term paddy	Rs. 81.60 (Rs. 33.00).
3	Water rates for paddy in reclaimed Kharland areas (coastal slaine areas).	For all varieties of paddy first two years of cultivation : Rs. 17.30 per hectare (Rs. 7 per acre). Third and fourth years of cultivation : Rs. 32.10 per hectare (Rs. 13 per acre). Thereafter from the fifth year, the normal rates as prescribed for paddy at (1) and (2) above, depending upon the variety of paddy grown.

NOTE: (*i*) Short term paddy means those varieties of paddy which require watering up to the 14th October.

(*ii*) Long term paddy means those varieties of paddy which require watering up to the 15th November.

Sr. No.	Name of Season or crop and other details	Rate per hectare (per acre)
4	Crops like Bajri, Batta, Juwar, Kodri and Maize.	Rs. 22.20 (Rs. 9.00).
5	Late Kharif Juwar ..	
	(*i*) During Kharif season ..	Rs. 22.20 (Rs. 9.00).
	(*ii*) For every post-Kharif additional watering sanctioned on canals form VI for maturity of crop.	Rs. 9.90 (Rs. 4.00).
6	Other food crops not mentioned above, Vegetables and grass.	Rs. 37.20 (Rs. 15.00).
7	Groundnuts and Kharif crops other than those mentioned above.	Rs. 49.40 (Rs. 20.00).
B.	**Rabi Season :**	
8	Short term wheat, *i. e.*, these varieties of wheat which require water upto 14th February.	Rs. 59.30 (Rs. 24.00 .

NOTE Free post or pre-seasonal watering will not be available for this crop, as in the case of other rab' crops.

APPENDIX E—*contd.*

Sr. No.	Name of Season or crop and other details	Rate Rs per hectare (per acre)
9	Long term wheat (*i. e.* those varieties of wheat which require water up to 14th March)	Rs 81.60 (Rs. 33.00)
10	Bengal Gram (Chana) .	Rs. 32.10 (Rs. 13.00)
11	Jeeru (Cumin seeds) ..	Rs. 81.60 (Rs. 33.00)
12	Variali (Fannel seeds) ..	Rs. 99 00 (Rs. 40.00)
13	Isabgul (Seasons to be reckoned from 15th November to 14th April)	Rs. 118.60 (Rs. 48.00)
14	Cheno (Season to be reckoned from 15th November to 14th April)	Rs. 79.10 (Rs 32 00)
15	Other food crops not mentioned above vegetables and grass.	Rs. 59.30 (Rs. 24.00)
16	Rabi crops other than those mentioned above.	Rs. 99.00 (Rs. 40.00)
C.	***Hot weather crops :***	
17	Hot weather Bajri and Juwar .	Rs. 59 30 (Rs. 24.00) *(For hot weather Bajri and Juwar crops, the season may be reckoned from 15th January to 14th May, wherever necessary).*
18	Food crops not mentioned above and grass.	Rs. 59.30 (Rs. 24.00)
19	Hot weather groundnuts and other hot weather crops not mentioned above.	Rs. 99.00 (Rs 40 00) (For hot weather groundnuts, the season may be reckoned from 15th January to 14th May, wherever necessary)
D.	**Two Seasonal Crops :**	
20	Cotton	Rs. 91.40 (Rs. 37.00) Break-up Kharif Rs. 32.10 (Rs 13 00) Rabi Rs. Rs. 59.30 (Rs. 24 00).
21	Bidi Tobacco ..	Rs. 66.70 (Rs. 27.00) Break-up Kharif Rs. Rs. 27.10 (Rs.11.00) Rabi Rs. 39.60 (Rs. 10 00).
22	All other varieties of Tobacco ..	Rs. 116.20 (Rs. 47.00) Break-up Kharif Rs. 34.60 (Rs. 14.00) Rabi Rs. 81.60 (Rs. 33 00).

APPENDIX E

STATUS OF WATER RATES AND COMPARISON WITH RATES IN OTHER STATES

Water rates for flow irrigation and lift irrigation *from canals and notified sources for* agricultural purposes.

Schedule of Water Rates

The structure of water rates in force with effect from 15th June 1971 up to *14th June 1974.*

Sr. No.	Name of Season or crop and other details	Rate per hectare (per acre)
A.	**Kharif Season :**	
1	Short term paddy	Rs. 59.30 (Rs. 24.00).
2	Long term paddy	Rs. 81.60 (Rs. 33.00).
3	Water rates for paddy in reclaimed Kharland areas (coastal slaine areas).	For all varieties of paddy first two years of cultivation : Rs. 17.30 per hectare (Rs. 7 per acre). Third and fourth years of cultivation : Rs. 32.10 per hectare (Rs. 13 per acre). Thereafter from the fifth year, the normal rates as prescribed for paddy at (1) and (2) above, depending upon the variety of paddy grown.

NOTE: (*i*) Short term paddy means those varieties of paddy which require watering up to the 14th October.

(*ii*) Long term paddy means those varieties of paddy which require watering up to the 15th November.

Sr. No.	Name of Season or crop and other details	Rate per hectare (per acre)
4	Crops like Bajri, Batta, Juwar, Kodri and Maize.	Rs. 22.20 (Rs. 9.00).
5	Late Kharif Juwar	
	(*i*) During Kharif season ..	Rs. 22.20 (Rs. 9.00).
	(*ii*) For every post-Kharif additional watering sanctioned on canals form VI for maturity of crop.	Rs. 9.90 (Rs. 4.00).
6	Other food crops not mentioned above. Vegetables and grass.	Rs. 37.20 (Rs. 15.00).
7	Groundnuts and Kharif crops other than those mentioned above.	Rs. 49.40 (Rs. 20.00).
B.	**Rabi Season :**	
8	Short term wheat, *i. e.,* these varieties of wheat which require water upto 14th February.	Rs. 59.30 (Rs. 24.00).

NOTE Free post or pre-seasonal watering will not be available for this crop, as in the case of other rab' crops.

APPENDIX E—*contd.*

Sr. No.	Name of Season or crop and other details	Rate Rs per hectare (per acre)
9	Long term wheat (*i. e.* those varieties of wheat which require water up to 14th March)	Rs. 81.60 (Rs 33.00)
10	Bengal Gram (Chana) ..	Rs. 32.10 (Rs. 13.00)
11	Jeeru (Cumin seeds) .	Rs 81 60 (Rs. 33.00)
12	Variali (Fannel seeds) ..	Rs. 99.00 (Rs. 40 00)
13	Isabgul (Seasons to be reckoned from 15th November to 14th April).	Rs. 118.60 (Rs 48.00)
14	Cheno (Season to be reckoned from 15th November to 14th April)	Rs. 79.10 (Rs. 32.0))
15	Other food crops not mentioned above vegetables and grass.	Rs. 59.30 (Rs. 24 00)
16	Rabi crops other than those mentioned above.	Rs. 99.0) (Rs. 40.00)
C.	**Hot weather crops :**	
17	Hot weather Bajri and Juwar	Rs. 59 30 (Rs. 24 00) (For hot weather Bajri and Juwar crops, the season may be reckoned from 15th January to 14th May, wherever necessary)
18	Food crops not mentioned above and grass.	Rs. 59 30 (Rs. 24 00)
19	Hot weather groundnuts and other hot weather crops not mentioned above.	Rs. 99.00 (Rs. 40.00) (For hot weather groundnuts, the season may be reckoned from 15th January to 14th May, wherever necessary)
D.	**Two Seasonal Crops :**	
20	Cotton	Rs. 91.40 (Rs 37 00). Break-up Kharif Rs. 32.10 (Rs. 13 00) Rabi Rs. Rs. 59.30 (Rs 24.00)
21	Bidi Tobacco . ..	Rs. 66.70 (Rs. 27.00) Break-up Kharif Rs. Rs. 27.10 (Rs.11.00) Rabi Rs 39.60 (Rs. 10.0)).
22	All other varieties of Tobacco ..	Rs. 116.20 (Rs. 47.00) Break-up Kharif Rs. 34.60 (Rs. 14.00) Rabi Rs. 81.60 (Rs. 33.00).

APPENDIX E—*contd.*

E. Perennial crops :

Sr. No.	Crop	Rate per hectare (per acre) per annum	Seasonal break-up		Two-seasonal break-up rate	
			Season	Rate Rs. per hectare (per acre)	Season	Rate Rs. per hectare (per acre)
1	2	3	4	5	6	7
23	Sugarcane ..	470 (190)	Kharif	99(40)	Kharif, Rabi	260(105)
			Rabi	161(65)		
			Hot Weather	210(85)	Rabi, Hot weather	371(150)
					Hot weather, Kharif	309(125)
24	Plantains ..	544 (220)			Hot weather Kharif	309(125)
24	Plantains ..	544 (220)	Kharif	114(46)	Kharif, Rabi	307(124)
			Rabi	193(78)	Rabi, Hot weather	430(174)
			Hot weather	237(96)	Hot wheather	351(142)
25	Rajko and other perennial crops not mentioned above	329 (133)	Kharif	77(31)	Kharif	
					Kharif. Rabi	186(75)
			Rabi	109(44)	Rabi, Hot weather	252(102)
			Hot weather	143(58)	Hot weather Kharif	220(89)

Note : Pre-seasonal and post-seasonal watering for rabi seasonal crops	One pre-seasonal watering or one post-seasonal watering will be allowed free of cost, provided it is availed of within one month before the commencement or after the rabi season only for seasonal crops sanctioned for rabi season. This facility will not be available for crops which have been sanctioned for rabi season only on break-up rates and for short-term varieties of wheat.
Note 2(*a*) : Single watering for bringing seasonal crops to maturity after the end of the season provided a separate sanction is obtained on canal Form VI (such single watering will not be allowed on water applications sanctioned at break-up rates).	Rs. 8 per acre (Rs. 19.70 per watering per hectare)
Note 2(*b*) : Additional watering if required for rabi crops after availing of the facility of free pre or post-seasonal watering.	Rs. 8 per acre (Rs. 19.70 per watering per hectare).
Note 3 : One watering for ploughing purpose within one month from the commencement of Kharif and Rabi seasons.	Rs. 8 per acre (Rs. 19.70 per watering per hectare).
Note 4 : Green manure	Rs. 5 per acre (Rs. 12.40 per season per hectare).
Note 5 : Water supply for leaching Khar-lands and coastal saline lands in Kharif season if surplus water is available.	Free of charge

Note 6 : For supply of water for food and fodder crops during testing period of canals of major and medium projects.	50 per cent of the above mentioned sanctioned rate for the first year and thereafter normal rates.

Note 7 : Watering rates chargeable on water applications received after prescribed dates for kharif season, if sanctioned.	Crop	For applications received within 30 days after the prescribed date.	For applications received after more than 30 days after the prescribed date.
(If water applications received after the prescribed dates for rabi and hot weather seasons are sanctioned the water rates will be levied as per rule 24 of Gujarat Canal Rules.)	(*i*) Perennial crops	Two times the above mentioned sanctioned rates.	Two times the above mentioned sanctioned rates.
	(*ii*) Paddy and other food and fodder crops.	Above mentioned sanctioned rates increased by one quarter or by Rs. 2 whichever is less.	One and half times the above mentioned sanctioned rates.
	(*iii*) Other cash crops	One and a half times the above mentioned sanctioned rates.	Two times the above mentioned sanctioned rates.

Note 8 : Monthly water rates for 'overlap' sugar-cane if sanctioned by the canal officer at his discretion during Kharif, Rabi and Hot weather seasons.

Season	Monthly rate under Pick-up weir scheme Rs. per hectare (per acre)	Monthly rate under Storage schemes Rs per hectare (per acre)
Kharif	27(11)	30(12)
Rabi	42(17)	47(19)
Hot weather	52(21)	57(23)

(Sanctions on monthly water rates will be given only upto the 14th April in Hot weather season If watering is required after this date the relevant seasonal break-up rate as sanctioned at 'E' above for sugar-cane will be charged.)

Note 9 · Lift Irrigation for seasonal crops For seasonal crops (not applicable to perennial crops even if sanction is obtained at seasonal break up)		
	(*i*) Lift Irrigation done from canals of pick-up weir schemes.	50 per cent of the above sanctioned rates.
	(*ii*) Lift Irrigation done from canals of storage schemes.	75 per cent of the above sanctioned rates.
	(*iii*) Lift Irrigation done from notified rivers, nallas, etc. upstream of pick-up weir schemes.	50 per cent of the above sanctioned rates.
	(*iv*) Lift Irrigation done from notified rivers, nallas etc. downstream of storage or pick-up weir.	Rs. 2.4[illegible] per hectare (Re. 1 per acre).

APPENDIX E—*contd.*

NOTE 10 : Lift Irrigation for perennial crops	
(1) Lift Irrigation done from notified rivers, nallas, upstream of head-works and from canals of weir or storage schemes	At full rate as per 'E' above.
(2) Lift Irrigation done from notified rivers, nallas, downstream of head-works of weir or storage schemes	50 per cent of the above mentioned rate for flow irrigation.
NOTE 11 : Block System of Irrigation	The orders issued under Government Resolution, P. W. D. No. MIP 2265/128-P, dated 5th September, 1967 should be implemented. Accordingly, the rate for kharif blocks in the command of Kakrapar Project should be 50 per cent of the above sanctioned rate for kharif seasonal crops.

Schedule of Water Rates for Irrigation under Tubewells

Category of Irrigation 1	Classification of charge 2	Rate for supply of water 3
1. Registered Irrigators Regular Irrigators)	(*a*) Standing charges	(*i*) A standing charge of Rs. 27.18 per hectare *i. e.* Rs. 11.00 per acre, for an irrigation year or a part thereof, for receiving supply of water for irrigation in any one season for crops other than perennial crops and thereafter an additional standing charge of Rs. 13.58 per hectare *i. e.* Rs. 5.50 per acre, for growing crops other than perennial crops in any of other seasons in the same irrigation year in the same area
		(*ii*) A standing charge of Rs. 67.92 per hectare *i. e.* Rs. 27.50 per acre, for an irrigation year for a part thereof for the perennial crops.
	Minimum standing charges	(*iii*) A minimum standing charge of Rs. 27.18 per hectare *i. e.* Rs. 11.00 per acre, for an irrigation year for all registered (regular) irrigators irrespective of whether they avail of tube-well water or not.
	Additional Surcharge	(*iv*) An additional surcharge of Rs. 27.18 per hectare *i. e.* Rs. 11.00 per acre, for seasonal cash crops such as " Jeeru ", " Variali ", " Isabgual ", " Cotton ", " Tobacco ", taking water in rabi season.
	(*b*) Variable charges	Variable charges for the volume of water, as measured at the V-Notch, at the rates mentioned below.

APPENDIX E—*contd*

Category of Irrigation 1	Classification of charge 2	Rate for supply of water 3
2. Kharif		
(*i*) Juwar and Bajri ..	Kharif	Rs. 0.25 paise per 10,000 litres or 2200 gallons
(*ii*) All crops except kharif Juwar and Bajri	Hot weather Kharif	Rs 0.23 paise per 10,000 litres or 2200 gallons
		Rs. 0 20 paise per 10,000 litres or 2200 gallons
	Rabi	Rs. 0 31 paise per 10,000 litres or 2200 gallons.
1 Minimum variable charges		(*i*) A minimum variable charge of Rs. 51.65 per hectare *i. e.* Rs. 20 90 per acre, if water is not taken in any irrigation year or if water is taken only for Kharif Bajri or Juwar in the Irrigation year
		(*ii*) If water is taken in any one or more seasons during irrigation year, the variable charge, at the rate prescribed at 1(*b*), (*ii*) above, subject to a minimum charge of Rs. 51.65 per hectare *i. e.* Rs 20 90 per acre per crop season.
		(*iii*) If water is taken for Juwar and/or Bajri during the Kharif season, the variable charge, at the rate prescribed at 1(*b*), (*i*) above, subject to a minimum charge of Rs. 13.58 per hectare *i. e.* Rs. 5 50 per acre per crop season.
2 Casual Irrigation .	(*a*) Standing charges	Standing charges at one and a half time the rates prescribed at 1(*a*) above for the registered irrigators (regular irrigators)
	(*b*) Variable charges	Variable charges for the volume of water supplied as measured at the V-Notch, at the rate mentioned below :—
(*i*) Kharif Juwar and Bajri	Kharif	Rs. 0 37 per 10 000 litres or 2200 gallons.
(*ii*) All crops except kharif Juwar and Bajri	Hot weather	Rs. 0.36 per 10,000 litres, or 2200 gallons
	Kharif	Rs. 0.26 per 10 000 litres, or 2200 gallons

APPENDIX E—*contd*.

Category of Irrigation	Classification of charge	Rate for supply of water
1	2	3
	(*c*) Minimum variable charges	After the water application of a casual irrigator is sanctioned for any crop-season, whether water is taken or not, the variable charges shall be subject to the following minimum :—
		(*i*) In respect of all crops except Kharif Juwar and Bajri the rate mentioned at (*ii*) above shall be subject to a minimum variable charge of Rs. 51.65 per hectare *i. e.* 20.90 per acre per season.
		(*ii*) In respect of Kharif Juwar and Bajri, the rate mentioned at 2(*b*) (*i*) above, shall be subject to a minimum variable charge of Rs. 13.58 per hectare *i. e.* Rs. 5.50 per acre.
3. Concession in variable charges	Registered as well as casual irrigators	(*i*) A concession of 25 per cent only in the variable charge, for sugar-cane, in all the three irrigation seasons.
		(*ii*) In the hot weather seasons, concession of 10 per cent only in variable charges for Juwar, Bajri, Kang and Jeena chana.
4. Variable charges for late applications.		
Registered as well as usual irrigators.	..	(*a*) Variable charges for all the water applications received and sanctioned for Kharif season after prescribed dates shall be*:—

*

Crop	For applications, received within 30 days after the prescribed date	For applications, received a fter more than 30 days after the prescribed date
1	2	3
(*i*) Perennial crops	Two times the variable charges	Two times the variable charges
(*ii*) Food and Fodder crops including Paddy	Variable charges increased by quarter or by Rs. 2 whichever is higher	One and a half time the variable charges
(*iii*) Cash crops except perennial crops	One and a half time the variable charges	Two times the variable charges.

APPENDIX E—concld.

Crop 1	For applications, received within 30 days after the prescribed date 2	For applications, received after more than 30 days after the prescribed the 3
		(*b*) Variable charges for all water applications received and sanctioned for Rabi and Hot weather seasons after prescribed dates shall be two times the variable charges for the respective season
		NOTE : For all late applications received and sanctioned for Kharif, Rabi and Hot weather seasons, the standing charges shall be at the prescribed rate
5. *Rate for Green Mannure*		
Registered as well as casual irrigators		The water rates for green manure shall be as per existing rates as sanctioned under Government Resolution, P.W.D. No. WTR / 1563 / P, dated 6th May, 1963 increased by 10 per cent

APPENDIX E—*contd.*

TABLE

Table showing water rates for principal crops under irrigation canals system in various States in India

Sr. No.	Name of the State	Water rates in rupees per hectare (acre)					Garden Orchards etc.	Irrigation cess, if any	Remarks
		Rice	Cotton	Wheat	Juwar Bajra Millets etc.	Sugarcane			
1	2	3	4	5	6	7	8	9	10
1	Andhra Pradesh ..	37.05 (15.00)	..	..	24.7 (10.00)	55 57 (22.50)	..	..	(1) Rates in States of Andhra Pradesh, Bihar, Gujarat, Haryana, Jammu and Kashmir, Maharashtra, Madhya Pradesh, Mysore, Orissa, Tamil Nadu, Punjab, Uttar Pradesh, Rajasthan, are as per details received from State authorities. (2) Rates of the remaining States as per data previously available in WTN dt. o. C. W. & P. C.
2	Assam	..	..	..	..	..	..	..	
3	Bihar	37.05 (15.00)	..	22.23 (9.00)	..	..	..	..	
4	Gujarat	59.28 (24.00) 81.1 (33.00)	32.11 (13.00) Kharif 59.28 (24.00) Rabi	59.28 (24.00) 81.51 (33.00)	22.23 (9.00)-to-32.11 (13.00)	491.53 (199.00)	..	(i) Irrigation cess has now been amalgamated with water rates. (ii) Local fund cess of 20 per cent water rates charged.	
5	Haryana	24.10 (9.75)	16.69 (6.75)	7.59 (2.75)-to-14.35 (5.81)	9.26 (3.75)-to-11.88 (4.81)	33.36 (13.50)-to-40.75 (16.50)	19.20 (8.25)	..	
6	Jammu and Kashmir ..	13.04 (5.28)-to-16.00 (6.48)	..	6.52 (2.64)	6.52 (2.64)	16.00 (6.48)	12.44 (5.04)	..	
7	Kerala	12.35 (5.00)-to-24.7 (10.00)	..	...	..	..	..		
8	Madhya Pradesh ..	19.76 (8.00)-to-24.7 (10.00)	19.76 (8.00)	9.88 (4.00)-to-24.7 (10.00)	19.76 (8.00)	49.4 (20.00)-to-74.1 (30.00)	49.4 (20.00)-to-74.1 (30.00)		

9 Tamil Nadu ..	..	39.52 (16.00)-to- 49.4 (20.00)	49.4 (20 00)-to- 61.75 (25 00)	..	18 52 (7 50)-to- 24 70 (10.00)	49 40 (20 00)	37 05 (15 00)-to- 49 40 (20.00)	
10 Maharashtra ..	..	37 05 (15.00)	133.38 (54 00)	22.23 (9 00)	14 82 (6.00)	296 4 (120 00)-to- 444 6 (180 00)	172 9 (70 00)-to- 296 4 (120 00)	*Irrigation cess is charged addition to water rates Western Maharashtra only for crops as under Rs. hectares (acres) Sugar-cane '74 1 (30.00) Other perennials 37.05 (15 00) Oth crop 7 41 (3 00
11 Mysore ..	..	39 52 (16 00)	19 76 (8 00)	19.76 (8 00)	19.76 (8 00)	49.40 (20 00)-to- 111.15 (45 00)	..	..
12 Orissa ..	..	2.47 (1 00)-to- 19 76 (8 00)	24.7 (10 00)	4.94 (2 00)	12.35 (5 00)	34.58 (14.00)	19 76 (8.00)	
13 Punjab ..	..	24.10 (9.75)	16.69 (6.75) to 18 91 (7 88)	7.59 (2 75) to 14 52 (5 85)	9.26 (3 75) to 12 02 (4.88)	45.89 (18 50) to 40 50 (16 50)	20 37 (8 25)	
14 Rajasthan ..	..	20.99 (8 5) to 22.23 (9 0)	30.5 (12 35) to 32 11 (13 00)	13 01 (5 25) to 21 70 (10 00)	9.88 (4 00) to 17.29 (7.00)	18 16 (10 50) to 67 95 (27 5)	32 73 (13 25) to 41 99 (17 00)	
15 Uttar Pradesh ..	..	12.35 (5 0) to 43 98 (17 50)	6.70 (2 50) to 13 88 (5 62)	12 35 (5 00) to 37 05 (15 00)	12 35 (5 00) to 21.61 (8.75)	29 64 (12.00) to 123 5 (50 00)	20 87 (8 45) to 46 50 (18 75)	
16 West Bengal .	.	13 58 (5 50) to 30 87 (12 50)	14.42 (6 00) to 37.05 (15 00)	..	22 23 (9 00)			

APPENDIX F

AREA DEVELOPMENT PROGRAMME OF THE MAHI-KADANA PROJECT

Project

Agriculture plays a very dominent role in the Indian economy and irrigation is absolutely essential for achievement of the higher productivity as well as to reduce the f.rmers' dependence on the very unpredictable rainfall. The Five Year Plans of the Country have therefore been drawn keeping this objective in the forefront and sizeable provision has been earmarked against irrigation and agriculture sectors in the Centre's as well as the State's Fourth Plan.

A broad survey of some of the completed irrigation projects has revealed that even though the civil works of the project get completed earlier, the rate of development of irrigation in the command area of the project is found to suffer a considerable slack. This is mainly because no sufficient attention is given to the ancillary activities connected with the area development programme including agricultural support programme and extension services. It has now been universally recognised that the objective of the i.rigation schemes cannot be achieved to the extent desired unless alongwith the completion of the headworks and canal system, proper planning is also made in respect of items connected with agricultural support programme activities. The main items concerning this programme are mentioned below :—

1. Land levelling
2. Construction of water courses and field channels
3. Land drainage
4. Net work of farm and other roads in the command area
5. Marketing and warehousing facilities
6. Establishment of the trial-*cum*-demonstration farms
7. Arrangement for timely procurement of inputs like fertilizers, pesticides, improved seeds
8. Establishment of credit societies or credit facilities to agriculturists
9. Consolidation of holdings wherever necessary
10. Investigation of groundwater resources

Mahi-Kadana Project of the Gujarat State has been planned and being implemented taking into consideration all the above items.

The above items so far as they relate to Mahi-Kadana Project are discussed below and the financial provisions are abstracted in the table attached :—

(*1*) *Land levelling*.—Normally the areas with slopes steeper than 0.8 per cent need levelling. It is estimated that on the Right Bank about 42,500 hectares of land mainly in paddy producing areas fall under this category.

The left bank command area is quite undulating as compared to that on the right bank, since about 75 per cent of the command area is having slopes steeper than 0.8 per cent considerable leavelling work is involved in this area. The work of land levelling is being carried out by the soil conservation branch of the Department of Agriculture. The cost however, is borne by the beneficiaries who could obtain credit from the Gujarat State Land Development Bank.

(2) *Construction of Water Courses and Field Channels.*—Construction of water courses and field channels is the liability of irrigators, but, they do not come forward to construct the water courses on a permanent and scientific basis. The irrigators have constructed water courses in about 46,135 hectares (1,14,000 acres) of the Right Bank Command, but the instances of scientific and permanent water courses are not found to extend to more than 2,104 hectares (5,200 acres.)

To expedite the work on construction of water courses and field channels, Government amended the relevant section of Bombay Irrigation Act, under which there is a provision of constructing permanent water courses at the cultivator's cost.

The work of construction of water courses and field channels is completely entrusted to the Agriculture Department. According to the programme the work is to be completed by 1975-76 and hence the Agriculture Department has started a special cell at Nadiad for this purpose. The progress achieved up to November, 1970 is shown below :—

	Nos.	hectares	(Acres)
1. Draft schemes surveyed	3,468	1,34,897	(3,33,327)
2. Draft schemes prepared	1,884	58,156	(1,43,702)
3. Consent of beneficiaries obtained above 51 per cent	945	24,425	(60,355)
4. Schemes forwarded to the Agriculture Department for taking further action.	934	24,160	(59,695)
5. Schemes where the work of construction of water courses is in progress.	190	5,088	(12,571)
6. Schemes where the water courses are completed ..	86	2,111	(5,216)

It has been observed that the cultivators have now realised the importance of water courses and the response for obtaining the consents has been found to be quite encouraging.

(3) *Land Drainage.*—In the Left Bank area, surface drainage is adequate and not expected to pose any special problem, on account of the undulating nature of the topography.

In the north-east of the Right Bank area, there are about 70,000 hectares, which consist of lighter soils. The ground water is also fresh and water table is at depth of about 10 m. At present there is no problem of drainage in this area, but however when perennial irrigation would be introduced, or completion of the reservoir at Kadana, there will be a considerable rise in the water table and therefore full-proof drainage system will have to be introduced.

In the lower part of the Right Bank areas; measuring about 1,00,000 hectares, the heavier clay soils have at present only moderate to poor internal drinage. The ground water underneath becomes more increasing saline and shallower towards the south-west, with adverse effects crop production. Main drainage by improved natural channels is considered adequate at present, but would have to be remodelled to prevent salinitation under perennial irrigation.

It is also further estimated that about 37,000 hectares in the south-western area would have to be reclaimed or improved by the intensive field drainage, with open channels to be laid down at the spacing of 60-150 m. and with buried tile drains in some low lying areas.

APPENDIX F—contd.

One full-fledged division has been recently opened to look after this work. A complete master plan of drainage for this area will now be prepared by this division.

(4) *Network of Roads.*—The planning of the roads in this area is made keeping in view the necessity of handling expected increase in the agriculture produce. The details of the programme are given below :—

On completion of this programme, the project area will have a grid of 1.6 km. which is considered quite adequate to meet with the needs of farmers.

Sr. No.	Category	Kms.	Particulars	Type of surface	F. W
1	1	3	4	5	6
1	M. D. R.	156	New construction or improvement	Bituminous	6 m.
2	O. D. R.	321	do.	do.	6 m.
3	V. R.	403	do.	Kankar or gravel	5 m.
4.	Farm roads	1,700	do.	do.	5 m.
5	Sugarcane extraction roads	400	do.	do.	5 m.
	Total ..	2,980			

Two divisions, one with headquarters at Nadiad, and the other with headquarters at Petlad have recently been opened to look after the above work.

(5) *Marketing and Warehousing Facilities.*—At full agricultural development, 7 years after the introduction of regulated water supply, production of foodgrains is projected to reach 7,11,200 tonnes (7,00,000 tons) annually. Some 3,04,800 tonnes (3,00,000 tons) are expected to be consumed on the farms and the balance would be sold in the market. Storage capacity (at present more than adequate at 2,54,000 tonnes/2,50,000 tons) would have to be increased. Most of the increase would be provided by private merchants, who own more than 75 per cent of present capacity, and the remainder by marketing and processing co-operatives. Since the full storage requirement would not arise until 1982 and present capacity would be adequate for most of the intervening years, the projects would not provide additional storage. Similarly, crop processing, over 70 per cent of which is now done by private industry, is expected to be provided for adequately through expansion of existing interests, including co-operatives, in step with the development of demand over the next 12 years.

(6) *Establishment of T. C. D. Farms.*—There is one 20 hectare T. C. D. farm in the project area at Thasra in R. B. Command. Number of experiments are being conducted for studying requirements of water as well as fertilisers and improved seeds, for various types of crops. Every year a farmer's day is celebrated here when number of cultivators from all over the command area gather here. They are given fullest understanding of the results of experiments, which help them in adopting new techniques, which would ultimately lead to increased production. Establishment of two additional farms in the area lower down is also under consideration of the Government.

In addition to above, the demonstrations are carried out in 1/2 acre plots, where different crops prevailing in the area are grown with improved seeds. This also helps the farmers considerably in appreciating the importance of using the improved variety of seeds.

Similarly in the L. B. area also it is proposed to establish two T. C. D. farms, one in Santrampur taluka and the other in Lunawada taluka. The locations of these farms have been finalised by the Agriculture Department in the villages Medhwas and Malvan. The L. A. proceedings are being started for acquisition of the land for these farms. These

farms will have a specific objective of determining through trials, the technique applicable to contour irrigation farming on bench terracing and demonstrating them on integrated farm size units representative of the proposed holdings, so that it would also help to demonstrate the advantages of land consolidation simultaneously.

(7) *Procurement of Fertilisers etc.*—Seeds fertilisers and agricultural chemicals are available in adequate quantity from the G. S. F. C. and other chemical fertilisers which are in the vicinity of the command area and as such no difficulty is anticipated in timely procurement of chemicals as well as fertilisers.

(8) *Establishment of the Credit Societies* — Most of the large land owners in the area, who cultivate over 40 per cent of the project lands, have traditionally depended upon their own resources Also there exists a very well laid down network of credit co-operatives consisting of primary societies at the village level, District Co-operative Banks at the district level and Apex Co-operative Bank at the State level

There are about 469 primary societies at the village level in talukas of Kaira district, Thasra, Anand, Borsad, Petlad, Cambay, Matar and Nadiad talukas covering about 632 villages in the R. B Command area. In the Left Bank Command, there are about 32 societies in Santrampur and Lunawada talukas of the Panchmahals district. Thus all the villages which are under the purview of the Kadana Project are covered by the primary societies.

Short term as well as long term loans required for agricultural purpose are given by these primary societies as such no problem in this respect is anticipated

(9) *Consolidation of land holdings* —The intensive nature of irrigated agriculture makes it obligatory that cultivators' holdings should be found in a compact block. However, it is very difficult to administer such a programme on the Right Bank because of the size and the advance stage of agriculture. These difficulties are not as serious in the Left Bank area, since the area is relatively small. The consolidation in this area is particularly desirable because contour irrigation system to be adopted in this area would invariably lead to fragmentation of the existing holdings Due to lot of practical difficulties as well as legal problems it is proposed to launch a trial land consolidation programme initially in the six villages adjacent to the T. C. D farms and later if feasible to expand the same to the entire Left Bank area The programme requires a well co-ordinated compaign by Revenue Department, Agriculture Department and Irrigation Department in association with the local bodies. A team has therefore been constituted consisting members from each concerned department so that the programme can be implemented in a co-ordinated manner.

(10) *Groundwater Investigation* —At present there are number of privately owned shallow wells and tubewells in the eastern half of the Right Bank command area. Some over pumping of the aquifer is also noticed in certain cases. After the Kadana Reservoir is completed the recharge of the aquifers will take place considerably. As a result of this it would be possible to enlarge the area under Rabi crops and at the same time the water supply can be supplemented in the periods of shortage. To assess the groundwater potential in the area, some headway has already been made. But further investigations particularly with reagard to artificial aquifer recharge, integration of groundwater into project water supply, observation of water table, its effect on drainage requirements, etc., are necessary. A separate Groundwater Directorate has recently been formed by the Government to take care of these issues The result of these investigations would open the door in the direction of supplementary demands for irrigation.

(11) *Research.*—There exist number of research stations in the State like one for irrigation crops at Junagadh, for cotton at Junagadh, for cotton and jower at Surat, the Bajri

APPENDIX F—contd.

Station at Jamnagar and Central Rice Research Station at Navagam in Kaira district. However, for the purpose of optimum utilisation of irrigation waters, research in the applied water mangement, soil properties, field drainage requirements, etc. will be necessary to be undertaken at some places in the command area itself. In addition, periodic training programmes to educate the farmers in water management practices will also be necessary throughout the area.

(12) *Co-ordinating Authority.*—As will be seen from above, the implementation of the integrated area developemnt programme depends upon the various Government as well as non-Government agencies and private bodies. Unless, therefore, there is co-ordination among the agencies, no positive progress can be expected in the direction. For Mahi-Kadana Project, therefore, Government has appointed a project co-ordinator and co-ordination committees at the Government level as well as at the project level. These committees meet frequently to review the progress in each activity and help tackling inter-departmental issues.

TABLE

Kadana Irrigation Project

Cost Estimates for Engineering Works as well as Agricultural Support Programme Activities for Remaining Works from 1970 up to Completion

		Estimated cost (Rs. in millions)
1. Kadana Dam		
Equipment for construction		
Main contractor	0.7	
Department	9.0	
Construction	99.3	
Land acquisition	35.0	
Sub-total Kadana Dam		144.00
2. Water Distribution System		
Main canals and branches distribution system, storage tanks and buildings ..		
Right bank area	61.0	
Left bank area	14.0	
Water Courses		
Right bank rectification	3.0	
Right bank	43.0	
Left bank	4.0	
Sub-total, Water Distribution System		125.00
3. Drainage System		
Field drainage, right bank	15.7	
Tile drainage, right bank	4.8	
Main drainage, right bank	7.5	
Main drainage, left bank	2.0	
Sub-total, Drainage System ..		30.00

APPENDIX F—*concld.*

		Estimated cost (Rs. in millions)
4. Road Improvement		
Major district roads	10.7	
Other district roads	20.8	
Village roads	7.1	
Land acquisition	7.0	
Farm Roads	9.4	
Sub-total, Road Improvement		55.00
5. Land Levelling		
Equipment	10.5	
Construction	37.5	
Sub-total, Land Levelling		48.00
6. Agricultural Supporting Services		
Demonstration and training facilities		
T. C. D. Farm, Kaira	0.60	
T. C. D. Farm, Thasra—Improvement	0.10	
2 T. C. D. Farms, Panchmahals	1.43	
Irrigation Training Centre, Thasra	0.23	
Extention service vehicles	2.30	
Sub-total, Agricultural Supporting Services		4.66
7. Investigations		
Groundwater investigations	1.5	
Agricultural studies	0.6	
Sub-total, Investigations		2.10
8. Administration and Engineering		
Kadana Dam	10.0	
Right bank irrigation	17.5	
Left bank irrigation	2.5	
Roads	4.0	
Sub-total, Administration and Engineering		34.00
9. Contingencies	57.3	
Total Remaining Cost of Project		500.06

APPENDIX G

ENGINEERING RESEARCH AND TRAINING PROGRAMME

1. Engineering Research

1.1 The successful completion of the projects of irrigation, buildings and roads involves a number of problems regarding foundations, construction materials, etc. right from the investigation stage to completion stage. At present such testing and research problems concerning the irrigation, building and roads projects are being attended to by the Engineering Research Institute, Baroda. The Institute comprises the following charges :—

1. Administrative and planning wing
2. Soil mechanics division
3. Material testing division
4. Hydraulics division
5. Soil survey organisation
6. Engineering geology division.
7. Tubewell research division

The Institute undertakes investigations of foundations, geological studies, testing of construction materials like rubble, cement, lime, sand, gravel, etc.; soil survey, reclamation and drainage experiments, designs of river training works models, prototype conformity etc; and conducts researches of applied and basic nature in the field of civil engineering subjects.

1.2 Keeping the perspective planning of the Fifth and Sixth Plans in view for the whole State, the Institute will have to be expanded into about 4 specialized Directorates to cope up with the work load of investigations and research connected with the irrigation projects, etc.

1.3 The approximate outlays for expending the Institute and in maintaining and running the research laboratories would be about Rs. 9.45 crores and Rs. 12.0 crores in the Fifth and Sixth Plans respectively.

2. Training Programme

General

2.1 Academic knowledge gained by any engineer until graduation is just enough to introduce him to his profession. It is in fact the practice and experience gradually gained by him during his association with the profession which acts as a grinding wheel to make him a skilled engineer in the practical field of design and construction. There are, however, some branches of engineering wherein specialised training is required over and above academic knowledge and field experience. Irrigation and hydro-power engineering is one such important branch forming backbone of the Indian economy.

Irrigation and Power development

2.2 It was only after the inaug ration of the First Plan that concentrated efforts were made to exploit the irrigation potential of the State. The State has been giving high priority to irrigation and large investments have been made in the three Five Year Plans and subsequent Annual Plans. Substantially large amount (about 50 per cent of the total outlay) has also been earmarked for the Irrigation and Power sectors in the current Fourth Five Year Plan. The first

multipurpose river valley project of the State viz. Ukai Project is in advanced stage of construction and is likely to be completed by end of Fourth Five Year Plan. Work on Kadana (Mahi Stage-II), Dharoi, Machhu-II and Damanganga projects are on hand Panam Project is recently cleared and it is taken up. Narmada Project which is under adjudication before the Narmada Water Disputes Tribunal is throughly investigated and can be taken up no sooner the Tribunal's award is received. This project, as contemplated by Gujarat, will be one of the biggest multipurpose river valley projects in the country. Work on Narmada and most of other projects will spill beyond the Fourth Five Year Plan.

Project for training

2.3 Special training will be required in the following branches of Irrigation and Power Engineering :—

1. Concrete technology
2. Hydraulic and structural design of dam and power house
3. Design and construction of concrete dam including foundation treatment.
4. Construction plant and layout
5. Instrumentation of dam (earth and masonry)
6. Material handling technique
7. Laboratory technique (soil and concrete)
8. Foundation grouting technique (earth dam and masonry dam)
9. Tunnel construction
10. Hydro-power installation
11. Design and installation of gates
12. Prestressed concrete (for major canal structures)
13. Design and construction of earth dam
14. CPM and PERT

Number of engineers will be required to be trained in the various branches stated above so that their services can be fruitfully utilised in implementation of the major irrigation and power projects in the State. The present training programme envisages ten years' period from 1974 to 1984.

Training can be imparted at following three places :—

(i) Institutes like Roorkee University where special / refresher courses are run

(ii) Irrigation and power projects under execution in other States in India

(iii) Training abroad under Colombo Plan etc

APPENDIX G—*concld.*

It is proposed to depute officers of various cadres for training every year as under :

	Institute	Irrigation and Power Project In India	Abroad
Superintending Engineer	..	2	1
Executive Engineer ..	2	4	2
Deputy Engineer	4	4	..
Average period of training per officer ..	6 months	1 month	6 months

Progressively the number should be increased.

3. Expenditure

As the expenditure (except pay and allowances) for training abroad will be borne by the scheme (e. g. Colombo Plan) under which the officer is deputed for training, the same has not been considered in the present proposal. As regards the training at Institutes like Roorkee, the expenditure involved will include fees and the travelling / daily allowance where as the training on other projects will involve expenditure on account of travelling / daily allowance only. For the purpose of estimate the pay of Superintending Engineer, Executive Engineer and Deputy Engineer is considered as Rs. 1,600, 900 and 600 respectively. Deputation allowance (consolidated daily allowance) is considered as 33.33 per cent of the pay as per existing rules. Tuition fee is considered as Rs. 100 p. m. and travelling allowance as about Rs. 300 per head. On the basis of above assumption the estimated expenditure per year will be as under :—

	Institute	Irrigation and Power Project In India	Abroad	Total
Superintending Engineer	..	9,600	9,600	19,200
Executive Engineer	17,400	6,200	11,400	35,000
Deputy Engineer	24,250	5,600	..	29,850
Total ..	41,650	21,400	21,000	84,050

Thus the expenditure per year will be of the order of Rs. 84,000. The expenditure estimated to be incurred for period of 10 years from 1974 to 1984 will, therefore, be Rs. 8,40,000.

APPENDIX G—*concld.*

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TABLE OF CONTENTS

PREFACE

In pursuance of the decision of the State Planning Advisory Board, taken in July, 1971, to prepare and publish a Perspective Plan for a ten year period (1974-1984), the State Government appointed several Working Groups for preparing an outline of such plan for the sectors allotted to them.

Following were the members of the Working Group for Industry, Power and Minerals:—

Shri Madanmohan Mangaldas	Chairman
Shri Jaikrishna Hariyallabhdas	Member
Shri Arvindbhai N. Mafatlal	"
Shri Utsavbhai Parikh, Chairman, Gujarat Mineral Development Corporation	"
Dr. B. D. Kalelkar	"
Shri J. J. Mehta, Chairman, Indian Petrochemicals Corporation Ltd.	"
Shri Jayantilal Bhikhabhai, Chairman, Gujarat Industrial Development Corporation	"
Shri Sanat Mehta	"
Shri K. A. Dave, Chairman, Gujarat Electricity Board	"
Shri M. D. Rajpal, Additional Chief Secretary, Industries Mines and Power Department.	Member-Secretary.

At its first meeting held on 31st July, 1971, at Ahmedabad, the Working Group appointed three sub-groups *viz.* (i) Industry, (ii) Power and (iii) Mining. The Working Group held six meetings to consider the reports of the sub-groups.

The salient features of the report on the ten year Perspective Plan are as under:—

(1) A total investment in the sector of Industry, Mines and Power, of Rs. 1,400.5 crores, providing employment to about 3 lakh persons and Rs. 1,939.2 crores providing employment to about 4.4 lakh persons has been proposed during the periods 1974-1979 and 1979-1984 respectively.

(2) Leading growth sectors identified in the Plan are Chemicals and Petrochemicals, Engineering and Textiles; Agro-Industries and Cottage Industries have also received their due share of attention.

(3) Estimates of the infrastructure required to support industry have been prepared as part of the Plan. These include power, water, transport and communications.

(4) Incentives and subsidies required to induce increased investment in the State have been spelt out in detail.

In preparing this report on a long term plan, the Working Group has attempted identification of the main directions of industrial growth in the State, keeping in view *inter-alia* the

Report of the Working Group
on
Industry, Power and Minerals

Part - I

Industry

REPORT OF THE WORKING GROUP
ON
INDUSTRY, POWER AND MINERALS

PART - I

INDUSTRY

Report of the Working Group on Industry, Power and Minerals

Part - I

Industry

CHAPTER I

GENERAL

1.1.1 While perspective planning aims essentially at defining goals and objectives aimed to be reached at, its most important function is to quantify the nature and magnitude of the task involved in achieving the desired objectives and thereby facilitate timely decisions particularly in areas where long years of preparation are needed.

1.1.2 Another important objective of long term planning is evaluation of the potential of development of a particular region and the nature of challenges that will have to be faced in realising it. Such an evaluation helps us in identifying the various constraints that may be operating, whether fields, economic, physical, financial or social, and thereby curb any undue tendency towards excessive optimism regarding possibilities of speedy transformation of economy or elimination of poverty.

1.2.1 The benefits of economic development must accrue more and more to the relatively less privileged class of people in order to create social and economic equality.

1.2.2 Our goal is to create a milieu in which even the small man will have the opportunity *of perceiving and participating in the immense possibilities of growth through organised effort.* In this sense, we have to achieve not only vertical mobility of labour but also horizontal mobility. At the same time, production must increase to keep pace with the increased demand on various sectors of the economy. A judicious balance has to be struck between the objectives of maximising employment potential and increasing production through labour-saving devices. It is possible, for instance, that a particular large scale industry requires the use of sophisticated machinery. However, it should not be forgotten that the setting up of such an industry would lead to development of tertiary and secondary employment in the economy, which would be able to absorb a lot more labour force. While framing the Perspective Plan for the Fifth and Sixth Plans, the study group has kept the above broad outlines before it.

1.3 The Fourth Plan was launched in 1969, when for the first time a perspective long term Plan was also drawn up for Gujarat covering a period of 15 years. The present attempts to project our needs into the next two Plan periods 1974-1984 and to formulate policies and programmes which are relevant not only for fulfilling the immediate targets of the Fourth Plan but also for the realisation of the national goals in the long run. Some of the projects, especially with reference to human resources and heavy capital intensive industries, have long gestation periods and as mentioned earlier unless we proceed immediately to identify precisely the need of the next ten to fifteen years, these projects may never come to fruition.

1.4 Till 1960 the industrial economy of Gujarat rested primarily on the textile industry and engineering industries ancillary to textiles. No doubt in the last decade small engineering industries, other than textile ancillaries, came into existence but these had only a marginal impact on the economy of the State. With the finding of oil, the setting up of refinery and fertiliser factory coupled with increased salt production and mineral exploration, the economic horizon has widened considerably providing scope for Chemical and Petro-chemical Industries. Nevertheless the textile industry will continue to play an important role in Gujarat's economy.

1.5 The State Government has already formulated a futuristic and imaginative industrial policy to secure benefits of rapid growth with minimum social cost and with equitable distribution of added wealth. The salient features of this policy are as follows :—

(1) Provision of full employment with increased production plus equitable distribution of capital and manpower resources.

(2) With a view to achieving diffusion and decentralisation of industries in the State, preference should be given to the under-developed regions so as to secure a more balanced economic development of the State as a whole.

(3) With a view to avoiding concentration of economic power in the hands of a few, preference should be given to new and young entrepreneurs for starting small scale and medium-sized industries in Gujarat.

(4) For developing better management, labour relations and higher productivity, a scheme for the workers' participation in equity capital and management should be evolved as early as possible. Further, emphasis should be laid on linking wages with increased productivity.

(5) Special care should be taken to avoid any unhealthy competition and friction between the organised sector and the village and cottage industries which provide employment to millions of our people. Attempts should, however, be made to make the decentralized cottage sector more efficient and productive.

(6) Industries promoted in the State should, by and large, be based on indigenous raw materials and domestic markets. Corporation should sanction industries with imported raw material only if its supply is ensured in advance by the Government of India.

(7) A high priority should be given to the establishment of those industries in the State which would promote import substitution and conserve valuable foreign exchange.

(8) The Corporations should give positive encouragement to the development of indigenous technical know-how by giving adequate facilities for research to young entrepreneurs, engineers and technicians.

1.6 Industrial Picture of Gujarat

1.6.1 The real industrial development of Gujarat started after 1960. On 31st December, 1960, there were 3,911 registered factories giving employment to 3,40,482 persons. The number of registered factories by end of year 1970 has gone up to 6,196 while the employment figure has gone upto 4,37,554. The total number of SSI units registered with Industries Department as on 31st March, 1971 was 16,413. During the period 1st May, 1960 to 31st March, 1971, 275 licences for substantial expansion have been granted besides 152 letters of intent. During this period, 387 licences both for new projects and for substantial expansions were implemented. A sum of Rs. 487 crores would have been newly invested in the fixed assets providing additional employment for about 1,26,000 persons.

1.6.2 At present, Gujarat contributes substantially to industrial production of India. About 30 per cent of cotton textiles, 95 per cent of Soda-ash, over 55 per cent of salt and over 20 per cent of the following products are manufactured in the State :—

(1) Cotton Yarn, (2) White-ware Crockery and Sanitary-ware, (3) Glazed Tiles, (4) Ebonite, (5) Clocks and (6) Pharmaceuticals.

1.7 According to Annual Survey of Industries, Gujarat ranks fourth in All India in value added by the Industrial sector and ranks third so far as employment in industry is concerned. The growth of industrial investment in the fixed assets in factories has shown considerable increase during the last decade. In the year 1959, the investment was only Rs. 101.84 crores. According to provisional results of ASI 1968, this investment has gone up to nearly Rs. 484.38 crores, nearly a four-fold growth. During the year 1969-70, actual investment in the licensed projects alone was about Rs. 70 crores. Besides, the investment in the small scale sector is estimated at Rs. 17.04 crores. Thus during the Fourth Plan period investment in the fixed assets will be of the order of Rs. 80 to 90 crores per annum i. e. between Rs. 400 to 450 crores during the entire Plan period.

ification

For the purpose of this Report, industries have been grouped as follows :—
) Chemicals, (ii) Petro-chemicals, (iii) Agro-based Industries, (iv) Textiles, (v) Engi-
ring and (vi) Cottage Industries.

.2 An attempt has been made to identify all ancillary and connected industries within
oup. However, in view of the fact that we are making perspective planning for a priod
years, it is quite likely that new technology may develop and replace some of the products
dd new items of manufacture. It is necessary to make a provision for such a development
g the interregnum. It is proposed that such investment would be of the order of 5 per
of the total investment now proposed in the Fifth Plan and 10 per cent in the Sixth Plan.

Parameters of Planning

As already indicated in para 1.5 relating to the State Policy, our emphasis has been on indus-
s based on indigenous raw materials. Production targets have been formulated on the basis
regional requirements in respect of commodities which do not have an all India market.
case of industries which cater to an all India market, it has been assumed that the State would
ntinue to have at least the same share as at present in the coming decade also.

1.10.1 The various tables under this section that follow Chapter V present an overall
picture of production, employment and investment during the Fifth Plan and Sixth Plan periods.
As the Fourth Plan has not yet come to an end, it is difficult to assess the final figures of
investment, production and employment that would be generated at the end of it Therefore,
these figures have not been given. All the investments are shown at current prices and
no escalations have been taken into consideration. Moreover, the investments that are
proposed in both the Plans are exclusive of working capital requirements.

1.10.2 With an investment of approximately Rs. 968 crores in the Fifth Plan the pro-
duction would be Rs. 1,494 crores and employment potential created for 2 71 lakh persons.
Similarly, for the Sixth Plan with an investment of Rs 1,312 crores and the production of
Rs. 2,278 crores, employment potential would be for 3 98 lakh persons This estimate of employ-
ment of 6 69 lakh persons during the two Plan periods relates to direct employment It would
be reasonable to assume that this investment would bring further growth in secondary and
tertiary sectors resulting in additional employment of 3 persons for every person directly engaged
Thus there would be an additional employment potential for 20 07 lakh persons by 1984

1 10.3 We have made a beginning in the Fourth Plan with the Petro-Chemical and
chemical industries. The Gujarat Refinery is operating at a level of 3 6 million tonnes
per year. The Udex Plant has gone into production. The DMT and Caprolactum
Projects are on their way to inplementation. The IPCL is entering in a big way for the
downstream projects like Detergent Alkylate, Acrylic Fibre, Ethylene Glycol, Synthetic Rubber,
etc These industries will play a predominant role in the economy of the State beginning with the
Fifth Plan. Therefore, it would not be inappropriate, if we describe the Fifth Plan as chemical
oriented. Based on this Petro-Chemical Complex, many other secondary and tertiary industries
will be set up. In addition, allied engineering industries for the manufacture of plants,
equipment and ancillaries to meet the requitments of the Petro-Chemicals Complex would
also be set up during the Fifth Plan and will have their full impact felt in the Sixth Plan. In
view of this, the Sixth Plan might well be described as engineering oriented.

1 11 In the small scale industry, the investment in the chemical and allied groups during
the Fifth Plan is expected to be of the order of Rs. 39.00 crores, and production about
Rs 142 00 crores. Corresponding figures for the engineering sector of the small scale indus-
tries are Rs 30 00 crores and Rs. 207.00 crores respectively. In the Sixth Plan, we anticipate
significant investments in the small scale sector based on Petro-Chemicals. This may be the
order of Rs 51 00 crores with an output of Rs. 187 00 crores. The engineering sector of the
small scale industries during the same Plan period may witness an investment of Rs. 47 00
crores and the production value of Rs. 201.00 crores.

1.12 Cottage industries have been assigned the role of manufacturing goods based on local resources in rural areas, which will give employment in non-urban centres.

1.13 This report includes a separate chapter on the textile industries. With modernisation and by working the textile mills round the clock on seven days, it would be possible to increase the production with the present level of machinery by about 35 per cent. The additional production would largely cater to the demand for textiles up to year 1979 and only 10 new units may have to be established.

1.14 Agro-industries have a vital role to play in the coming decade. The perspective Plan on Agro-industries envisages a three-pronged attack—

(a) Development of protein based industries ;
(b) Development of fisheries on the coast line of Gujarat (which has been taken care of by the Agriculture sub-Group); and
(c) Development of processing industries including cattle feeds.

1.15.1 In drawing up this Plan, we have taken into consideration the aspect of achieving a balanced regional development and dispersal of economic activity. For any underdeveloped backward area, the main requirement would be the infrastructure facilities and finance. A number of incentive schemes are already under implementation and some more have been suggested in the chapter on " Incentives and State Outlay " for overall development of the State and especially for these backward regions.

1.15.2 State Government will have to provide Rs. 142 crores and Rs. 150 crores as capital outlay on various schemes during the Fifth and Sixth Plans respectively for the Industries sector. Similarly, Rs. 20 crores each are proposed to be provided by way of State Capital Outlay during Fifth and Sixth plans for the schemes of Mining sector. For Power, a total amount of Rs. 332 crores and Rs. 426 crores will have to be raised from the State Government, Central Government and other financing agencies during the Fifth and Sixth Plans respectively. This amount does not include Rs. 600 crores required for setting up a Nuclear Power Station by Government of India.

1.16.1 The production of adequate quantities of fertilizers provides the main basis for the green revolution. The GSFC in its first phase was operating at 1,50,000 tonnes of ammonia and 1,03,000 tonnes of urea capacity per year. It has expanded in its second phase to a total capacity of 3,15,000 tonnes of ammonia and 3,68,000 tonnes of urea by August 1969. IFFCO at Kalol will produce the following fertilizers by 1974:—

	Tonnes per annum
(1) Ammonia	3,00,300
(2) Urea	3,96,000
(3) N. P. K. Fertilizer	4,75,000

The Mithapur Project of Tatas with an investment of Rs. 55 crores in the first phase is expected to produce the following fertilizers :—

	Tonnes per annum
(1) Triple superphosphate diammonium phosphate ..	3,00,000
(2) Ammonia	2,10,000
(3) Urea	2,00,000
(4) Ammonium chloride	1,80,000

1.16.2 Thus, Gujarat will produce adequate quantities of fertilizers for providing not only the needs of the State but would contribute significantly to the requirements of other parts of the country and so play a vital role in providing the important inputs for bringing about the green revolution in the country.

1.17 Again, Gujarat is fortunate in having rich mineral deposits. It is necessary to plan for a judicious and planned exploitation of our mineral wealth to secure optimum benefits. Bauxite

is one of the most important deposits in the State, on which we can base an alumina plant, aluminium smelter and fabrication units. In fact, effective steps have already been initiated for setting up such a complex with an estimated investment of Rs. 130 crores. A separate company is expected to be formed with Union / State participation for executing this project. Such a massive investment in the core sector is bound to provide a fillip to the secondary and tertiary sectors of the economy. The base metal discovery near Ambaji would provide the much needed lead, copper and zinc, which are at present being imported. A smelter to utilise the same could be planned in the coming decade. Perspective Plan for other minerals takes care of covering the entire State systematically through scientific geological surveys. The Plan also takes into account the research, development and laboratory facilities that would be required. Streamlining of certain administrative procedures has also been suggested. One of the main draw-backs for exploitation of minerals has been the lack of approach roads to the mines. The Plan has suggested a provision of Rs. 5 crores for this purpose. It is estimated that nearly 20,000 people were employed in mining in 1970. This is expected to create additional employment opportunities for about 16,000 people in the Fifth Plan and for 26,000 people in the Sixth Plan. A total investment of Rs. 211.20 crores including GMDC schemes is envisaged in the mining sector.

1.18.1 Another aspect of planning relates to the generation of power, vital for breaking the vicious circle of poverty and for coming out of the mould of stagnation. Co-ordinated efforts have to be directed to bridging the gap between present needs and future sufficiency. The Perspective Plan for power *envisages an outlay of Rs. 1,003 crores excluding the atomic power station* to generate adequate power to meet the needs in the subsequent Plan periods. Resources of primary energy in the form of oil, gas and coal being limited, Gujarat will have to depend ultimately on nuclear power and a station of adequate size will have to be established to meet the evergrowing demand for power in the State. Success in achieving the specified targets in this sector would be most crucial as any shortfall in the generation programme will have a network of crippling effects on the entire economy of the State.

1.18.2 The power plan envisages additional employment opportunities for 10,000 people during the Fifth Plan and 11,500 people during the Sixth Plan.

1.18.3 To summarise, the Perspective Plan for the Fifth and Sixth Plans would generate investment and employment to the following extent :—

	Investment (Rs. in crores)	Employment (persons in lakhs)
Fifth Plan		
Industries	968	2.71
Mining	20 (Excepting base metals and aluminium smelter covered under industries)	0.16
Power	412 (Exclusive of investment in the nuclear power station)	0.10
Sixth Plan		
Industries	[illegible]	[illegible]
Mining	[illegible] (Excepting base metals and aluminium smelter covered under industries)	[illegible]
Power	[illegible]	[illegible]

(Bk) II-40—28

CHAPTER II

SECTORAL GROWTH POTENTIALS

CHEMICAL INDUSTRIES

2.1 Gujarat has a long coast line of over 1,600 km. and climate specially suited for the production of salt. The present production of salt in the State is about 3.5 million tonnes which accounts for nearly 60 per cent of production in the country. In view of the anticipated growth for alkali industry and possibility of exports, it is proposed to achieve a production of 6 million tonnes of salt by the year 1978-79 and 7.5 million tonnes by the year 1983-84. This will open up large areas which are generally backward for the development of marine chemicals such as bromine, bromides, potassium chloride, magnesium chloride and such other important chemicals.

2.2 The demand within Gujarat for caustic soda and chlorine is expected to rise considerably during the Fifth Plan period. With the availability of good quality salt, we have proposed the establishment of a big alkali complex in the public joint sector.

2.3 Availability of chemical grade limestone close to the salt works gives a unique advantage to Gujarat for the production of soda ash. With the growing demand for soda ash, which is a basic chemical, the existing units are expected to expand and new units are also likely to be set up.

2.4 Gujarat has extensive deposits of limestone upon which the cement industry of the State has been developed. Nearly 14 per cent of the national production of cement is contributed by Gujarat. On account of the limited local consumption the surplus production, as at present, will have to be sold in other parts of the country or exported.

2.5 Gujarat has large fluorite deposits in the backward areas of Baroda district. A unit for the production of fluorine chemicals which are imported at present has already been established in the State. Further expansion of this industry has been envisaged.

2.6 Gujarat, being far away from the coal fields, will have to look for alternative sources of energy for power generation. The cost of power in Gujarat is high. This has retarded, to some extent, the growth of electro-chemical industries. Intensive efforts will, therefore, be necessary to ensure cheaper sources of energy, laying particular stress on the generation of hydro-power from the Narmada and the establishment of an atomic power station. The entire question has been discussed at length in the chapter on "Power"

2.7 Gujarat has extensive deposits of good quality bauxite. Production of alumina is being planned which would subsequently be used for production of aluminium. Similarly, the rich deposits of china clay, silica sand, quartz, etc. have given rise to growth of ceramic and refractory industries. There are attractive prospects for further development in these new areas.

2.8 Gujarat has a well developed dyestuffs and pharmaceutical industry. Production in the initial stages was based on imported intermediates, though basic raw materials like benzene, toluene, naphthalene were available. There was, therefore, a need for a centralised agency to co-ordinate the production of intermediates with available basic raw materials. Messrs. Hindustan Organic Chemicals Limited, Panvel had been set up for this purpose. Simultaneously dye-stuffs and pharmaceutical manufacturers have also taken steps to extend their production stages to co-ordinate with the programme of HOC. The availability of basic chemicals like benzene, toluene, xylenes in the State also has opened up an extensive area for the development of other organic chemical industries.

PETROCHEMICAL INDUSTRIES

2.9 Refining Capacity

2.9.1 The Gujarat Refinery at Koyali is presently processing 3.6 million tonnes crude per year. The present capacity of the refinery is 4.3 million tonnes. The product pattern at present is as follows :—

Design Product Pattern	Tonnes/Year
L. P. G.	10,000
Solvents	25,000
Naphtha	3,02,800
Motor spirit	3,71,400
Kerosene	7,03,200
JP-4 plus ATF	2,40,000
High speed diesel	9,36,000
Red crude	7,92,000
Gas	1,34,000
Total	35,14,400
Losses	85,600
Tonnes/Year	36,00,000

2.9.2 The additional refining capacity either by way of expansion or by setting up of new refinery has to be based on two considerations

(1) Availability of crude oil whether indigenous or imported, and

(2) demand for the petroleum products in the region.

2.10 According to the present estimates, against our requirements of 35 million tonnes of crude by 1975-76 to meet our demand for petroleum products in the country, indigenous availability would be around 9 million tonnes only, thus necessitating imports to the extent of 26 million tonnes.

2.11 With regard to the import of crude, Gujarat coast enjoys locational advantage of being nearest to the Middle Eastern countries. In fact, the Government of India has already thought of locating an oil terminal in the Saurashtra coast between Salaya and Sikka. The demand projections for middle distillates for the supply area of Koyali refinery up to 1980 are shown in table below :—

TABLE

(Figures in 000 tonnes)

	Year					
	1975	1976	1977	1978	1979	1980
Kerosene 12 per cent	715.9	766.6	858	961	1,070	1,205
A. T. F. 18 per cent	52.2	55.5	68.4	80.6	101	119
H. S. D. 17 per cent	1,255.4	1,414.0	1,655	1,936	2,265	2,650
L. D. O. 18 per cent	622.2	663.0	782	922	1,059	1,253
(Million tonnes annum)						
Middle distillates	2.6457	2.9036	3.363	3.9096	4.530	5.257
Total Production (100/42)	6.328	6.967	8.071	9.264	10.872	12.616
Refining Capacity (100/85)	7.4	8.0	9.5	10.8	12.75	14.8

2.12 From the above projections, it will be seen that there is enough justification to expand the Koyali refinery to meet the requirement of the petroleum products in its own supply area. Moreover, the setting up of a north-west refinery would take at least 4 to 5 years. On the other hand, the demand for petroleum products in the north west area will have to be met during this interregnum. The Koyali refinery can easily meet this demand in the shortest possible time by way of expansion. Thirdly, it has been estimated that each additional million tonne refinery by way of expansion of an existing refinery would cost only Rs. 4 crores, against Rs. 15 crores required for setting up of a new one million tonne refinery. In view of this Koyali refinery should be expanded to 8.5 million tonne immediately.

2.13 The expansion of the Gujarat Refinery will have several advantages also as it can take crude from Bombay as well as Kandla as both are at equal distance. Moreover the Petro-chemical Complex, the fertilizer units at Gujarat State Fertilizers Company, Baroda can get naphtha over short distances. The LSHS could be further utilised by way of hydro-cracking, partial oxidation or by puting up a coking unit. The Gujarat Refinery kerosene and diesel, which are of higher grade, are sold without any extra returns. With the imported crude, this can be adjusted without resorting to desulphurisation. Even if disulfurisation is required, it will be minimal compared to other places where crude is of high-sulpher. The synthetic rubber industry would also benefit because of the extra availability of gas. The State could plan for sponge iron plant based on the platformer gas. It goes without saying that the expansion of the existing refinery would keep to the minimum the overhead cost as well as the administrative expenditure because of ready availability of infrastructure facilities and the trained staff.

2.14 The economics of scale should be utilised to the optimum level by expanding the Koyali refinery to 8.5 million tonnes. However, there is an optimum limit beyond which any refinery cannot be expanded. In view of this, it is suggested that a 3 million tonne refinery should be established on the Saurashtra coast to supplement the demand for petroleum products in the decade of 1974-84.

2.15 On the assumption that a total refining capacity of 11.5 million tonnes will be created in Gujarat, the naphtha expected to become available will be about 1.6 million tonnes out of which 0.75 million tonnes have been committed for fertilizer and petro-chemicals production leaving a balance of 0.85 million tonnes. Even after providing additional 0.3 million tonnes for fertilizer production, it would be possible to increase the cracking capacity to one million tonnes with the available balance of naphtha. The down-stream projections have been worked out on this basis.

2.16 Gujarat Petro-chemicals Complex will consist of two major projects (1) Aromatics Project and (2) Olefins Project.

Aromatics Project

This project is expected to go on stream sometime by mid 1972. Based on the raw materials produced in the project (DMT, Oxylene, mixed xylene) the following projects will be set up in the State:—

(a) *Polyester Staple Fiber* (*6,100 tonnes/year*).—This unit will meet the demand of textile industry for this fibre.

(b) *Polyester Film Unit* (*2,000 tonnes/year*).—Currently large quantities of the imported polyester film is used as artificial zari by silk industry at Surat. This unit will meet the demand of zari industry from year 1973-74 onwards.

(c) *Phthalic Anhydride Unit.*—About 6,000 tonnes/year of phthalic anhydride and 7,550 tonnes/year of plasticisers will be produced which will meet the demand of Gujarat's plastic conversion industry from this project.

2.17 Olefins Project

This project is expected to go on stream during the year 1974 and will lead to the production of the following items :—

(a) *Low Density Polyethylene*.— Currently only 20,000-22,000 tonnes per year of LDPE is produced in the country. With the additional production of 60,000 tonnes per year of LDPE from the complex, the plastic conversion industry will be able to expand considerably in the State offering excellent opportunities to young entrepreneurs.

(b) *Mono Ethylene Glycol*.—(MEG) (20,000 tonnes/year).—Polyester staple fibre and polyester film unit will be able to draw their requirements of both DMT and MEG from the complex.

(c) *Polypropylene*.— At present there is no production of polypropylene in the country and only limited quantities (1,000 tonnes/year) are imported. With the availability of 30,000 tonnes per annum of polypropylene from this complex from the year 1974 onwards a large number of products will be produced in the State by plastic conversion industry.

(d) *Acrylonitrile*.— About 24,000 tonnes per year of acrylonitrile will be available for the production of acrylates, ABS and SAN. Acrylates are currently imported in the country and are mostly used by the leather and textile industry. A unit producing 4,000 tonnes/year of acrylates (methyl, butyl, ethyl) will be set up in Gujarat which would be able to meet all India estimated demand for these products. ABS and SAN are plastics which are very suitable for special applications. They are not yet produced in India and they would become available from indigenous sources (in Gujarat) (5,000 tonnes/year) for the first time based on acrylonitrile from the complex.

(e) *Acrylic Fibre*.— (12,000 tonnes/year) This fibre known as synthetic wool is very popular in overseas countries. India is chronically short of wool and about Rs. 17.00 crores of wool per year is imported. With the availability of acrylic fibres from this complex, the woollen industry in the country will be able to run to full capacity and produce a variety of new products. Moreover, felt industry, carpet industry, industrial filters and blankets industry will also be able to expand their production A wide variety of cotton acrylic textiles will also be produced enabling the textile industry to maintain its lead in fashion and variety in the country

(f) *Methyl Methacrylate*.— A unit with production of about 5,000 tonnes per year of methyl methacrylate monomer will be set up in Gujarat based on hydrocynic acid from this complex. MMM will be produced in India for the first time. This plastic finds use in light fittings, stationery articles and publicity articles. This unit will be able to meet substantially, the demand for this product.

(g) *Cynide Salts*.— These salts are essentially required by the electroplating and heat treatment industry and are imported at present. A unit producing about 2,000—3,000 tonnes per year of cynide salts based on hydrocynic acid from this complex will be set up in Gujarat which will meet all India demand of these cynide salts for the first time from indigenous sources. The availability of cynide salts in Gujarat will also give impetus to the electroplating industry in the State.

(h) *Carbon Black*.— A unit producing carbon black can be set up in the State based on the availability of 11,500 tonnes per year of pyrolysis fuel oil from this complex.

(i) *Synthetic Rubber*.— A 20,000 tonnes per year of high cispolybutadiene synthetic rubber plant will be set up in the complex. This will be the second synthetic rubber plant in the country but the first petro-based rubber plant. This rubber finds use mainly in tyres and shoes industry.

(*j*) *C_4 Streams-Isobutylene.*—A unit for the production of isobutylene will be set up. This is a good feed stock for manufacture of various chemicals.

(*k*) *Detergent Alkylate (DA)*.—With the availability of 30,000 tonnes per year of detergent alkylate, the synthetic detergent industry in Gujarat, particularly in the small scale sector, will get considerabe scope for expansion and setting up new units. This will result in considerable saving of foreign exchange on import of both detergent alkylate and of mutton tallow.

(*l*) *Caprolactum* (20,000 tonnes/year).—Based on benzene available from the Gujarat Complex, a caprolactum unit is being set up in Gujarat. Caprolactum is a monomer for nylon-6, which is used for producing nylon filament yarns and film. It is also used as plastics for producing various nylon articles which find special uses in various industries and help substitute the use of steel and other scarce conventional materials. Plastic industry and the textile and art silk industry will be able to expand further in the State when this project goes on stream.

(*m*) *Maleic Anhydride.*—Based on benzene availability from the complex, a maleic anhydride unit (3,000 tonnes/year) will be set up in Gujarat. This is used by the paint and synthetic resin industry.

(*n*) *Ethylene, Propylene, Benzene, Xylene, Butadiene* .—Small quantities of these products will be available to small scale entrepreneurs in the State to set up a number of industries for producing various chemicals and other intermediates.

(*o*) *Styrene.*—A styrene project is now envisaged during the early part of the Fifth Plan. The availability of styrene will enable expansion of the plastic industry in the State.

(*p*) *Vinylchloride.*—A vinylchloride plant is envisaged in the early part of the Fifth Plan. This also will enable the plastic conversion industry in the State to expand further.

2.18 It will be observed from the above that the substantial quantities of most of the products and especially plastics resins will become availabn le ithe Fifth Plan and Sixth Plan periods as a result of the expansion of the plans envisaged and mentioned elsewhere. This would open out very substantial opportunities to entrepreneurs to set up intermediate manufacturing and other allied industries in the State.

Industries Based on Gas likely to be Discovered in Gujarat

2.19 The ONGC has undertaken exploratory activities to locate further fields for oil and gas in Gujarat. In fact they are preparing a decade plan for such exploration to conserve the available foreign exchange utilised for imports at present. In view of this, further finds of gas fields in Gujarat cannot be ruled out. Recently ONGC has struck a gas field in one of the wells at Dabka near Baroda and its commercial exploitation could be established after 2/3 more wells are drilled. It is, therefore, necessary to plan for gas utilisation in the coming decade. Apart from the use of gas as feed-stock for the fertilizers and other units, the gas, if available, could also be profitably used for some of the industries as fuel. One such industry could be sponge iron plant, where the entire economics of the plant would change if the required quantum of gas is made available. The other industry which could be based on gas chemical feed-stock is methanol. However, the project planning for such industry could be undertaken only after knowing the firm availability of gas.

Agro-based Industries

2.20 Gujarat has four major industrial agricultural crops—(1) cotton, (2) tobacco, (3) sugarcane, and (4) oil seeds.

Cotton

2.20.1 There are 117 textile mills of which 91 are composite units and 26 are spinning mills. The installed capacity of these mills is 36,85,054 spindles and 63,832 looms. Over and above this, Surat, Ahmedabad, Cambay, Navsari and Dholka are humming with power-looms on cotton and man-made yarn. Gujarat's contribution to the textile industry of the country is around 30 percent.

Tobacco

2.20.2 Gujarat produces good virginia tobacco in addition to the low grade variety used for the manufacture of bidi. However, industrial production of the tobacco products is insignificant. Two units are now being established in the State and the targets have been indicated for further exploitation of this important cash crop. Manufacture of cigars has a very good scope in the State.

Sugar-cane

2.20.3 At the time of bifurcation of the State, there was hardly any sugar production in this area. To-day, there are five units crushing over 9,000 tonnes of sugar-cane per day. Four more units have been licensed and two are having letters of intent. Even with all this expansion, local production will not meet even half of the requirement. With the additional irrigation facility from Ukai dam and Kakrapar weir in South Gujarat and energised wells, it is envisaged to have about 15 more units in the coming decade. Incidentally, molasses and bagasse are two important by-products of this industry. It is proposed to use molasses for the production of industrial alcohol. This would form a very important raw material for organo-chemical industries. Similarly, bagasse would be a basic raw material for a paper unit.

Oil Seeds

2.20.4 Gujarat is one of the largest producers of oil seeds, such as ground-nut and cotton-seed. Oil therefrom is primarily recovered by expellers and subsequently by solvent extractions. De-oiled cake was till recently a very important export item from the State, exporting worth Rs 8.00 crores per annum. Modest progress has been made in hydrogenating oil and a small beginning has been made in making cattle-feed. There is a vast scope for manufacture of these items as more seeds become available as a result of improvement in agriculture.

Forest Products

2.20.5 Gujarat is deficient in forest. Even then it has encouraged a pulp factory based on the bamboos of the forest of Dangs district. It is proposed to grow fast growing varieties of trees like bamboos and eucalyptus on the banks of canals as also in the valleys of the Narmada and the Tapti which are good raw materials for pulp and paper industry to be set up in the Sixth Plan

2.20.6 Although there are many facets of agro-industries, greater emphasis will be on protein production, processed foods and fisheries in the coming decade.

Protein

2.21 How serious is the problem of mal-nutrition in our country hardly needs emphasis. Gujarat grows a significant portion of the total ground nut crop in India. A good beginning has also been made in the cultivation of soyabean, as a mixed crop with cotton. The de-oiled cake produced from the groundnut is a very good source of edible protein for human consumption. The technology for separation of this protein from de-oiled cake is developing and it is expected that with the availability of raw materials and the developing technology, the protein production will be an important industry in the coming decade. At the same time, there is a growing realisation about the importance of protein in our diet and it is therefore expected that the demand for protein rich foods would grow significantly in the coming decade.

Processed Foods

2.22 To-day processed foods figure only marginally in our diet. However, it is expected that the demand for processed foods would increase steadily. In fact use of bread, jams, etc. has already started. Processed food, particularly canned fruits and vegetables, would therefore have a good scope in the coming decade. Gujarat grows a wide variety of fruits and vegetables as well as cereals like wheat, rice, etc., which are important raw materials for processed foods.

Fisheries

2.23 Gujarat having the largest coast line and having rich resources of quality fish like pomfrets, Bombay-duck and prawns, the potential for fisheries is much more in Gujarat than in any other State. This is more so because these resources have not so far been utilised to even a fraction of the available potential. The demand for frozen shrimps and canned and fresh fish is likely to grow in India and has already been established abroad. In this direction, Gujarat Agro-Industries Corporation is setting up a subsidiary to undertake the exploitation of marine resources in an integrated manner. The project involves a capital outlay of Rs. 2.5 crores and includes catching, processing, transporting and marketing operations of all types to be implemented in a three year phased programme. It may be noted that other industrial houses of the country are also planning to establish their operations on the Saurashtra coast.

2.24 Potential also exists for other industries, such as cattle feed factories, cold storage, oil extraction units, compost manure plants, rice and pulse mills, guar gum processing, furfural from agricultural waste and many other industries based on agriculture, region-wise development of which is outlined in Appendix D.

Textile Industries

Introduction

2.25 At present there are 117 cotton textile mills in the State, out of which there are 91 composite textile mills and 26 spinning mills. The installed capacity of these mills as on 1st January, 1971 was 36,85,054 spindles and 63,832 looms.

Per capita availability, estimates of per capita consumption by 1984—Total requirement of various types of textiles

2.26 The per capita availability of cotton cloth in the year 1969 was 13.51 metres and that of man-made fabrics was 1.76 metres. The per capita demand of textile is going up steadily at a slow rate. According to studies of textile, 1960-75 by Economic and Scientific Research Founda tion, New Delhi, per capita demand of textile by 1975, as a reasonable projection is 21 metres (all types-cotton, rayon and synthetic). The estimated composition of demand in 1975 is 75 per cent cotton, 10 per cent rayon and 15 per cent synthetics. The per capita demand of cloth of 21 metres in 1975 is on the high side, if we consider increase in per capita availability of only 2.52 metres during 1951 to 1969. Under such circumstances, it is presumed that during next 14 years, *i. e.* by 1984, the per capita demand for cloth will be 17.7 metres at 1 per cent annual growth rate. Accordingly, in 1984 the requirement of textiles will be per capita demand by 1984 multiplied by estimated population in 1984, *i. e.* 17.7×75.4 crores=13345 million metres.

2.27 Additional capacity required for meeting demand by 1979 and 1984

2.27.1 Appendix E gives the per capita estimated demand, population, total requirement of cloth and additional capacity required for all India as well as share of Gujarat in additional capacity to be created, looms/spindles required.

2.27.2 The production of cotton textiles can be increased by modernising the machinery by working 24 hours just like continuous processing system in chemical industry and by increasing the number of productive working days in a year or by installing new capacities of spindles and

powerlooms. At present, there are 36.85 lakh spindles and their production capacity can be increased by about 35 per cent if the efficiency ratio of existing machinery is increased. The efficiency ratio has been computed as under :—

(1) Working be raised from 22½ hours to 24 hours in a day.
(2) Number of productive days be increased from 310 to 330 in a year.
(3) Production of cloth be increased from 100 metres to 120 metres per day per loom.

$$\text{Efficiency} = \frac{24}{22\frac{1}{2}} \times \frac{330}{310} \times \frac{120}{100}$$
$$= \frac{1056}{775} = 1.36$$

2.27.3 Value of efficiency ratio is, therefore, 1.36 which indicates that implementation of this will enable us to increase production with existing machinery by about 35 per cent.

2.27.4 The increased production due to this efficiency ratio of 35 per cent on existing machinery will be equivalent to 0.35 × 36 85 lakhs *i e.* 12 90 lakh spindles. These spindles will enable us to meet the capacity required by 1979 to that extent and as such the additional capacity required by 1979 will be 15.50 lakh spindles minus 12 90 lakh spindles = 2.60 lakh spindles.

2.27.5 Similarly, the additional demand in the country would be of the order of 2123 million metres per annum by 1984. Gujarat's share in this additional requirement can be estimated to be 6.37 million metres. The yarn requirement and the weaving could be undertaken by 13.25 lakh spindles and 26,500 looms. The estimated investment in these machineries would be of the order of Rs. 200 crores.

2.27.6 From the above, it would be seen that with the modernisation and establishment of 2,60,000 spindles and 5,000 looms, the State would be able to meet the rising demand of the population upto 1979. As per Modernisation Committee Report, for the modernisation of the textile industry the country needs approximately Rs. 200 to 225 crores. We produce nearly 30 per cent of the country's production and hence we would need approximately Rs 65 crores This report was submitted in January 1969. Since then the prices of machinery have substantially increased and it would not be incorrect to presume that we would need about Rs 80 crores at the current prices to modernise the existing textile mills. During the period 1974-79, therefore, the estimated investment in the textile industry in Gujarat could be of the order of Rs 120 crores inclusive of investment in machineries for additional spindleage and loomage Similarly in the Sixth Plan we would need about Rs. 200 crores to meet the additional demand because of the increase in demand and the rise in population.

2.28 Woolen Textile

2.28.1 The woollen textile industry in India has been severely handicapped due to the non-availability of good quality of raw wool. India had to import raw wool, wool waste etc., to the tune of about Rs 17.1 crores in 1969-70. To decrease such massive import of wool it has been planned to produce acrylic fibre as a substitute to wool. Moreover, efforts are being made to increase indigenous availability of wool and also to improve quality of wool in India. This will save foreign exchange and will also help woollen textile industry by ensuring continuous supply of required raw materials.

2.28.2 There are two woollen textile mills in Gujarat, *viz.*, Shri Dinesh Mills Limited, Ranoli and Messrs. Digvijay Woollen Mills Limited, Jamnagar with 15,570 spindles and 16[illegible] powerlooms. Gujarat has produced in the year 1970, 1.20 million metres of wearable woollen fabrics and 2.60 lakh kgs. of non-wearable fabrics. The State's contribution to all India wearable fabrics was 8.97 per cent and that to non-wearable fabric was 6.02 per cent

2.29 The Fourth Five Year Plan of Government of India has indicated that as against capacity of 43.6 million metres of woollen cloth in 1968-69, the production was only 12.8 million metres. Even in 1970, the total production of woollen wearable fabrics in India was only [illegible] million metres. The Planning Commission has anticipated production of 200 million

woollen cloth by 1973-74. Even if we assume 100 per cent increase in production of woollen cloth in the next 10 years *i. e.* by 1984, the anticipated production will be 40 million metres of woollen cloth as againt present installed capacity of 43.6 million metres. As such, it will be advisable not to create additional capacity for woollen cloth in the next 15 years, but to make arrangement by augmenting supply of raw material for full utilisation of present installed capacity. At the most one unit may be established specifically for using only acrylic fibre in Gujarat.

2.30 Engineering Industries

2.30.1 Engineering industries are the basic industries which form the nuclei for the growth of other industries. The engineering industries have hitherto concentrated in Eastern India. This necessitates diversification of the engineering industry into the other parts of the country. The consumer industry is fairly well established in the western region of the country and the basic engineering industries have to be established to feed the consumer industry.

2.30.2 The engineering industry in the State of Gujarat is still at an infant stage and it is necessary to make rapid strides in this field. Once the heavy industry is set up, there will be a healthy growth of the consumer industry, ancillary industries, etc.

2.30.3 A plan has been drawn out for setting up the basic engineering industry in the Fifth Plan. An intensive engineering industry-oriented plan has been envisaged for the Sixth Plan. The following items briefly describe the projects envisaged.

2.31 Iron and Steel Industries-Sponge Iron Plant

2.31.1 Gujarat is endowed with resources of natural gas. The modern technology of steel making is by reducing the iron ore directly into sponge iron using natural gas. Sponge iron in turn forms the raw material for the electric steel melting practice. These enable the production of low and high alloy steels and sponge iron complements steel scrap which is a scarce commodity in the country. A sponge iron plant with an investment of Rs. 15 crores and having a capacity of 0.2 million tonnes per year could be planned in the Fifth Plan with an additional capacity of 0.5 million tonnes in the Sixth Plan. Iron ore, could be obtained from Goa.

Alloy Steel, Electric Furnaces and continuous Casting Plants

2.31.2 Continuous casting units are replacing the rolling mills. A few units comprising of electric furnaces, continuous casting units and re-rolling mills of the economic capacities of 50,000 tonnes per year could be set up. These will use sponge iron as raw material. The continuously cast billets can be supplied to a number of re-rolling mills which are already producing wires, bars, etc. (in the State of Gujarat). The continuous cast skelp bars and slabs can be further processed to skelp and strip. These can be supplied to the existing tube mills and also to the container industries. Re-rolling mills can produce the merchant bars for building construction, light structurals and strips.

Pig Iron Plant

2.31.3 Pig iron forms the raw material of many of the foundries in Gujarat. We have numerous foundry plants which are well established. In view of this a pig iron plant is proposed of capacity of 0.3 million tonnes per year in the Fifth Plan and an expansion of additional capacity of 0.5 million tonnes in the Sixth Plan. There will be a continuous growth in the demand of pig iron in foundries.

Tube Mills

2.31.4 There is a very great un-satisfied demand of seamless, E RW and fertzmoon tubes in the country. Further, there is great export potential for these tubes. In Gujarat we have two tube mills and a plant of 1,00,000 tonne tube mill in Fifth Plan to be expanded to 200,000 tonnes in the Sixth Plan could be set up.

Steel Wires and Ropes

2.31.5 In setting up more electric furnace plants, it will be possible to produce steel suitable for the manufacture of wires and ropes. With the rapid industrialisation in the country and with continuous demand of steel wires and ropes, a plant producing 25,000 tonnes of steel wires and ropes could be set up.

2.32 Non-ferrous Metals

Alumina-Aluminium Complex

2.32.1 Gujarat has rich deposits of bauxite which can be economically exploited for producing alumina and aluminium products. This industry is a highly power intensive one. Aluminium is gradually replacing steel and aluminium alloys are the metals of the future. It is very timely that an aluminium complex of a capacity of Rs. 130 crores is being proposed to be set up in the backward district of Kutch. This complex will also hold sufficient environment for setting up of a number of ancillary units in aluminium metal industry.

Powder Metallurgy Units

2.32.2 Many of the sophisticated components of the machineries are made out of sintered products. Powder metallurgy is yet to be established in the country. Since these units are not very capital intensive, to save considerable amount of foreign exchange, powder metallurgy units with capital investment of the order of Rs. one crore for each unit for producing powders of copper, iron, silver, cadmium, etc. could be set up. Such units can supply the raw material for electrical and electronic components and other machinery components.

2.33 Engineering Industry

Foundries

2.33.1 Gujarat has a well established group of industries in foundry and has the skilled labour in this field of engineering. It is essential to exploit the same and promote the industry in a big way. Foundries manufacturing grey iron, malleable iron and steel castings of capacity of 50,000 tonnes per year during Fifth Plan could be considered. Malleable cast iron plants can be considered which can manufacture components for automobile and ingineereng industries which are presently mostly imported. A unit of " Investment Casting " could be considered which is the latest in the field of technology, having a capital investment of the order of Rs. 50 lakhs, which can produce sophisticated castings presently being totally imported.

Forging

2.33.2 Forgings similar to castings form the basic raw materials for machinery manufacture. Forging plant producing 10,000 M.T. per year of alloy steels and steel forgings can be considered. A small forging unit which can specially produce pipe forging which are totally imported to-day should be planned. These units further produce forgings suitable for the manufacture of textile machinery, material handling equipments, paper and pulp machineries, rolls for re-rolling plants, blanks for the reduction gears, shafts and spindles, etc. Further the forging units can be expanded in the Sixth Plan to produce additional 20,000 tonnes per year.

Chemical Plant Fabricating Complex

2.33.3 There is a heavy concentration of the chemical industry in the State of Gujarat. A big petrochemical complex and other allied chemical industries are likely to come up in Fifth Plan. It is absolutely necessary to manufacture plant and equipment required for petro-chemical, chemical and fertilizer industries within the State. Most of these plants and equipment are currently imported. Manufacturing of these plants within Gujarat will not only save considerable foreign exchange but also make the country self-sufficient in the know-how and also further enable setting up of the industry rapidly.

woollen cloth by 1973-74. Even if we assume 100 per cent increase in production of woollen cloth in the next 10 years *i. e.* by 1984, the anticipated production will be 40 million metres of woollen cloth as againt present installed capacity of 43.6 million metres. As such, it will be advisable not to create additional capacity for woollen cloth in the next 15 years, but to make arrangement by augmenting supply of raw material for full utilisation of present installed capacity. At the most one unit may be established specifically for using only acrylic fibre in Gujarat.

2.30 Engineering Industries

2.30.1 Engineering industries are the basic industries which form the nuclei for the growth of other industries. The engineering industries have hitherto concentrated in Eastern India. This necessitates diversification of the engineering industry into the other parts of the country. The consumer industry is fairly well established in the western region of the country and the basic engineering industries have to be established to feed the consumer industry.

2.30.2 The engineering industry in the State of Gujarat is still at an infant stage and it is necessary to make rapid strides in this field. Once the heavy industry is set up, there will be a healthy growth of the consumer industry, ancillary industries, etc.

2.30.3 A plan has been drawn out for setting up the basic engineering industry in the Fifth Plan. An intensive engineering industry-oriented plan has been envisaged for the Sixth Plan. The following items briefly describe the projects envisaged.

2.31 Iron and Steel Industries-Sponge Iron Plant

2.31.1 Gujarat is endowed with resources of natural gas. The modern technology of steel making is by reducing the iron ore directly into sponge iron using natural gas. Sponge iron in turn forms the raw material for the electric steel melting practice. These enable the production of low and high alloy steels and sponge iron complements steel scrap which is a scarce commodity in the country. A sponge iron plant with an investment of Rs. 15 crores and having a capacity of 0.2 million tonnes per year could be planned in the Fifth Plan with an additional capacity of 0.5 million tonnes in the Sixth Plan. Iron ore, could be obtained from Goa.

Alloy Steel, Electric Furnaces and continuous Casting Plants

2.31.2 Continuous casting units are replacing the rolling mills. A few units comprising of electric furnaces, continuous casting units and re-rolling mills of the economic capacities of 50,000 tonnes per year could be set up. These will use sponge iron as raw material. The continuously cast billets can be supplied to a number of re-rolling mills which are already producing wires, bars, etc. (in the State of Gujarat). The continuous cast skelp bars and slabs can be further processed to skelp and strip. These can be supplied to the existing tube mills and also to the container industries. Re-rolling mills can produce the merchant bars for building construction, light structurals and strips.

Pig Iron Plant

2.31.3 Pig iron forms the raw material of many of the foundries in Gujarat. We have numerous foundry plants which are well established. In view of this a pig iron plant is proposed of capacity of 0.3 million tonnes per year in the Fifth Plan and an expansion of additional capacity of 0.5 million tonnes in the Sixth Plan. There will be a continuous growth in the demand of pig iron in foundries.

Tube Mills

2.31.4 There is a very great un-satisfied demand of seamless, E RW and fertzmoon tubes in the country. Further, there is great export potential for these tubes. In Gujarat we have two tube mills and a plant of 1,00,000 tonne tube mill in Fifth Plan to be expanded to 200,000 tonnes in the Sixth Plan could be set up.

Steel Wires and Ropes

2.31.5 In setting up more electric furnace plants, it will be possible to produce steel suitable for the manufacture of wires and ropes. With the rapid industrialisation in the country and with continuous demand of steel wires and ropes, a plant producing 25,000 tonnes of steel wires and ropes could be set up.

2.32 Non-ferrous Metals

Alumina-Aluminium Complex

2.32.1 Gujarat has rich deposits of bauxite which can be economically exploited for producing alumina and aluminium products. This industry is a highly power intensive one. Aluminium is gradually replacing steel and aluminium alloys are the metals of the future. It is very timely that an aluminium complex of a capacity of Rs. 130 crores is being proposed to be set up in the backward district of Kutch. This complex will also hold sufficient environment for setting up of a number of ancillary units in aluminium metal industry.

Powder Metallurgy Units

2.32.2 Many of the sophisticated components of the machineries are made out of sintered products. Powder metallurgy is yet to be established in the country Since these units are not very capital intensive, to save considerable amount of foreign exchange, powder metallurgy units with capital investment of the order of Rs. one crore for each unit for producing powders of copper, iron, silver, cadmium, etc. could be set up. Such units can supply the raw material for electrical and electronic components and other machinery components

2.33 Engineering Industry

Foundries

2.33.1 Gujarat has a well established group of industries in foundry and has the skilled labour in this field of engineering. It is essential to exploit the same and promote the industry in a big way. Foundries manufacturing grey iron, malleable iron and steel castings of capacity of 50,000 tonnes per year during Fifth Plan could be considered. Malleable cast iron plants can be considered which can manufacture components for automobile and ingineereng industries which are presently mostly imported. A unit of " Investment Casting " could be considered which is the latest in the field of technology, having a capital investment of the order of Rs. 50 lakhs, which can produce sophisticated castings presently being totally imported.

Forging

[illegible]

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Thus, a chemical plant fabricating complex having a design cell, fabricating shop, machine shop and testing equipment units could be considered. The design cell can have well qualified and experienced engineers who can be trained in the field of manufacture of these sophisticated plants.

Textile Machinery Project

2.33.4 A project for manufacturing textile machinery should be planned. There are quite a few plants in other States manufacturing textile machinery to day but in the last few years there is more usage of synthetic fibre in the field of textiles. This proposed unit will be oriented to manufacture machinery for processing synthetic fibre and also to produce sophisticated automatic textile machinery which are totally imported to day. Such automatic plants will increase the productivity of textile mills. A project for machine building plants for the manufacture of paper and pulp machinery, sugar machinery, printing machinery, dairy machinery, material handling equipment, building and road construction machinery, E. O. T. Cranes etc. could be planned. These are low capital intensive projects, the capital investment ranging from Rs. 1 to Rs. 5 crores, but they provide the necessary base for the growth of other industries in Gujarat. Further they are highly labour intensive.

Machine Tool Project

2.33.5 Machine tool projects at Bhavnagar and Kandla free port could be considered. There are many machine tools for which there is an unsatisfied demand in the country such as centreless grinding machines, precision drilling machines, employing electro discharges of electro-chemical techniques, automats, bolt heading machines, cold forging machines, machine for dyes and tools using electrolytic metals (plan miller, boring mahines, cylinderical grinders, drilling machines, broaching machines, automats etc.). Further there is also a tremendous scope for export of the conventional machine tools. It is also necessary to set up a mother plant supplying machine tools for the other industries in the State. The Bhavnagar Machine Tool Project with an investment of Rs. 6 crores could be planned to meet these demands.

Tractors, commercial vehicles, motor cars, scooters etc.

2.33.6 With the advent of green revolution there are more and more tractor users in India. A number of tractor manufacturing units have been set up in the country. One more tractor manufacturing unit could be set up in our State with a capacity of about 10,000 tractors per year. This will help rapid mechanisation of agriculture in our State which will go a long way in increasing agricultural production. Automobile industry in other countries forms nearly 20 to 30 per cent of the total engineering industry in those countries. To day in our country this industry is still in a very rudimentary stage and a unit for maufacturing of commercical vehicles and cars could be planned in the Sixth Plan. There is already a unit manufacturing scooters in the State and it will be expanded further.

Ball and roller bearing industry

2.33.7 The present capacity of the manufacture of ball and roller bearings in the country is of the order of 12 million bearings per year and this will fall short of the demand to the extent of 28 millions at the end of the Fourth Plan and 58 millions at the end of the Fifth Plan. Every year bearings worth Rs. 8 to 10 crores are being imported. There is also a tremendous export market for bearings.

2.33.8 A big ball and roller bearing complex could be set up which will have a capacity of 20 to 30 million bearings per year. In the first phase, this unit can produce the raw materials like inner and outer races, hydro-statically extruded tube and about 10 million bearings per year. This will save the entire foreign exchange that is being spent on importing the raw material for the existing bearings manufacturers. In the Sixth Plan this can be expanded to produce 30 million bearings.

2.34 Electrical Machinery

2.34.1 With the rapid industrialisation of the country the demand of the electrical goods, viz. transformers, motors, switch gears, etc. will be continously rising. Units for the manufacture of these items could be considered for which there is a considerable demand within the State of Gujarat. Further with the rapid rural electrification the country and in Gujarat in particular, there will be a requirement of a number of distribution transformers, motors for agricultural use, fans, refrigerators, etc. Units for manufacturing of electric lamps and fluorescent tubes could be planned for which there is already an unsatisfied demand. Further there is no such unit in Gujarat manufacturing electrical lamps and the State market itself is sufficient for setting up such a unit. Units manufacturing refrigerators, air-conditioners, washing machines, vaccum cleaners, water coolers, etc. for which the demand is continuously on the increase could be planned.

Heavy electrical complex

2.34.2 At present there are heavy electrical units at Hardwar, Bhopal, Trichy and Hyderabad which are mostly oriented for producing electrical machinery, boilers and power plant equipment. To day most of the industrial controls and industrial control components such as relay resistors, master controllers, contractors, air circuit breakers, fuses, rectifiers, solid state devices, etc. are totally imported and only assembled in India. It is worthwhile setting up a heavy electrical complex which can produce only the industrial controls and control components (in collaboration with such reputed manufacturing companies like IGE, (USA), SIEMENS, (Germany), Hitachi, (Japan), etc.) Such an industry is highly labour intensive, giving employment to more than 15,000 people.

2.35 Electronics

2.35.1 The electronic industry in the country is still in the beginning stage and it has been recognised that immediate steps should be taken for setting up the electronic industry in Gujarat. We have also set up an industrial estate which is totally meant for setting up electronic industries. Special incentives are being offered to the entrepreneurs manufacturing the electronic goods.

2.35.2 Units manufacturing electronic components, electronic instruments, digital equipment, televisions, tape recorders, etc. could be considered. An electronic component dye-manufacturing unit would be set up which can supply the dyes for the manufacture of components. These electronic industries are highly labour intensive and have a lot of export potential in addition to the saving of foreign exchange.

Ancillary Industries

2.36 A number of ancillary units could be set up in the State. One such unit for the manufacture of the fuel injection pumps, nozzles, nozzle holders, elements, delivery valves, etc. would be set up. With the increased manufacture of tractors, heavy vehicles and diesel engines, this unit can be in a position not only to meet the heavy replacement market but also of the original equipment manufacturers. Thus it is evident that with the setting up of heavy engineering industries, there will be enough scope for a number of entrepreneurs to set up ancillary industries in the State.

2.37 The overall investment in engineering industries envisaged during the Fifth and Sixth Plans would be to the order of Rs. 227 and Rs. 447 crores respectively with a corresponding rise in the levels of production of Rs. 562 crores and Rs. 974 crores. The employment generated will be around 1,18,890 and 1,91,360 during the Fifth and Sixth Plans respectively.

2.38 Cottage Industry

2.38.1 The programme for village and cottage industries has been divided into [illegible] groups. The financial outlay for each of these groups under the State Plan [illegible]

centrally sponsored scheme namely Rural Industries Project during the Fourth Plan is as detailed below :—

I. Under State Plan Schemes.

Group	Outlay during the Fourth Plan (Rs. in lakhs)
1. Khadi and village industries ..	23.50
2. Handloom	40.00
3. Powerloom	25.00
4. Handicrafts	13.00
5. Coir	0.50
6. Cottage industries	72.50
Total ..	174.50
II. Under Centrally Sponsored Scheme ..	50.00
Grand Total ..	224.50

2.39 The details of Ten Year Perspective Plan (1974-84) for each of these groups are as under :—

Khadi and Village Industries

2.39.1 The programme for Khadi and Village Industries is implemented through the State Khadi and Village Industries Board. These industries play an important role in providing employment opportunities at low capital cost to the rural people and weaker sections of the community. The names of industries which are within the purview of the Board are as under :—

1. Khadi (cotton and woollen)
2. Bee keeping
3. Cottage match industry
4. Cottage pottery industry
5. Cottage soap industry
6. Flaying, curing and tanning of hides and ancillary industries connected with the same and cottage leather industry.
7. Ghani oil industry.
8. Manufacture of cane gur and khandsari.
9. Palm-gur making and other palm-products industry.
10. Processing of cereals and pulses.
11. Fibre (other than coir)
12. (*i*) Blacksmithy and carpentry (manufacturing and serving not involving the use of power. Power may be used in the case of manufacture of Amber Charkhas and their accessories).
    (*ii*) Blacksmithy and carpentry pertaining to implements and equipment connected with industries under the purview of the Khadi and Village Industries Commission.
13. Manufacture and use of manure and methane gas from cowdung and other waste products (such as flesh of dead animals, night soils, etc.).
14. Cottage industry of limestone and its products.
15. Manufacture of shellac.
16. Collection of forest plants and fruits for medicinal purposes.
17. Fruits processing and fruit preservation.
18. Manufacture of household utensils from aluminium.
19. Bamboo and cane work.

...,30,500 as under :— ... prepared a programme for the Fifth Plan which is estimated

	Rs.
Expenditure for Khadi schemes	1,01,00,000
Expenditure for village industries schemes and other miscellaneous schemes.	49,51,500
Expenditure for the staff	64,79,000
Total ..	2,15,30,500

2.39.3 It will be observed from the above figures that the estimated cost of the programme is very high compared to the provisions of Rs. 23.50 lakhs made for the Fourth Plan. It is, therefore, proposed that a provision of double the amount of the Fourth Plan i. e. Rs. 47 lakhs should be made in the Fifth Plan for Khadi and Village Industries. The Board has indicated that considering the targets for the year 1978-79 as a basis, further progress would be 20 per cent per annum and as such programme at the end of the Sixth Plan would be twice as much as that of the Fifth Plan. Accordingly, it is proposed that a provision of Rs 94 lakhs i. e. double the provision of the Fifth Plan should be made for the Sixth Plan period. The Board proposes to develop the programmes of production of khadi, oil ghani, neera and palm-gur, village leather industry, hand made paper, cane, gur and khandsari, fruit processing, cottage match industry, etc. from the provisions to be made in the State Plan, while certain other programmes will be undertaken by the Board from the funds made available by the All India Khadi and Village Industries Commission.

2.40 Handloom

2.40.1 Handloom industry in the State is a part-time industry and persons engaged in this industry are mostly of backward classes. As weavers get higher wages in other fields, they undertake this industry only in slack seasons when there is no employment. There are, however, a few small pockets like Kanodar, Dholka, Bagasara, Vaso, etc. where the traditional weavers are concentrated and are mainly dependent on handloom industry.

2.40.2 There are at present 27,000 handlooms in the State, 50 per cent of which are under the co-operative fold. It is proposed to bring 75 per cent of handlooms under the co-operative fold and also to increase the working of defunct handlooms. It is proposed that 1300 more weavers will be employed during the Fifth Plan and 1900 during the Sixth Plan. The weavers' societies will be rendered necessary financial assistance by way of loans and subsidies during these two Plans. The value of handloom cloth produced during the year 1968-69 was to the tune of Rs. 67.70 lakhs under the co-operative fold and it is proposed to increase the production to the tune of Rs. 500 lakhs during the Fifth Plan and Rs. 650 lakhs during Sixth Plan.

2.40.3 The cloth produced by the handloom weavers is coarse and as such it does not find ready and profitable market except in the rural areas. The wages earned by the weavers for producing coarse cloth are also quite low. It is, therefore, proposed that suitable incentives should be provided to the weavers' societies for undertaking production of finer varieties of cloth which would ensure higher wages to the weavers. It is, therefore, proposed to assist the weavers' societies in procuring improved tools and equipment for the purpose. A programme for imparting training is also proposed to be undertaken. It is further proposed to subsidise the weavers during the initial stages for adopting new designs in production of handloom cloth. Weavers ...y, with added advantage, be deputed for training in other States such as Andhra Pradesh, ...rala, Tamil Nadu where the handloom industry has developed well. Similarly, expert weavers in other States may be attached to the weavers' societies in our State for imparting practical ...ing to the local weavers.

2.40.4 As against provision of Rs. 40 lakhs for the Fourth Plan, it is proposed to ...vide 45 lakhs during the Fifth Plan and Rs. 50.50 lakhs during the Sixth Plan.

2.41 Powerloom

2.41.1 As against the target of 400 powerlooms earmarked in the co-operative sector for the Fourth Plan period, it is proposed to install 800 powerlooms during the Fifth Plan and 1200 powerlooms during Sixth Plan. The progress made during the first two years of the Fourth Plan has been satisfactory since it has been possible to organise four co-operative powerloom societies and to allot 256 powerlooms to these societies. The programme for the Fifth and Sixth Plans is expected to provide employment to 900 persons during the Fifth Plan and 1,350 persons during the Sixth Plan.

2.41.2 At present there are no facilities for processing of powerloom cloth, with the result that the powerloom societies are not able to secure reasonable prices of the unprocessed cloth. It is, therefore, proposed to start two sizing plants and one calendering-*cum*-dyeing-*cum*-bleaching and finishing plant together with printing unit during the Fifth and Sixth Plan periods.

2.41.3 As against the total outlay of Rs. 25 lakhs during the Fourth Plan, it is proposed to provide Rs. 50 lakhs and Rs. 75 lakhs for the Fifth and Sixth Plans respectively.

2.42 Handicrafts

2.42.1 The handicrafts of Gujarat have earned a fame for their exquisite beauty as well as the underlying creative genius of the craftsmen. Some of them are cloth printing by hand blocks, manufacturing of blocks, cloth weaving including dye wax and clay resist, dyeing, agarak, woollens including dhablas and felts, wood-work including lacquerware, wood-carving, marquetry, stone-carving, pottery, metal-wares including jewellery and costume jewellery including agates, embroidery including jari embroidery, perfumeries and incense, ivory work, toy-making, etc. The artisans engaged in these handicraft industries are scattered all over the State. They are encouraged to form their own co-operative societies wherever possible and assistance is given to such societies. Where it is not possible to form their co-operatives, they are assisted individually. Under the Fourth Plan, financial provision has been made for the development of handicrafts by way of loans and subsidy and share capital contribution for establishment of emporia and sales depots, establishment of show-cases, setting up rural crafts museum, etc. The Gujarat Export Corporation has also granted assistance for promoting export of handicraft goods. Training programme for preservation of certain crafts such as Kachhi bharat, Banni bharat, patola weaving, etc. have also been undertaken. A State Design Centre is also set up for imparting training in certain handicrafts and for development of designs. Competition for best design as well as display is undertaken every year and consequently Gujarat has been getting theNational Award for various handicrafts continuously for the last three years. Special weeks are also celebrated for promoting the sales of handicraft goods. An emporium for sale of handicraft goods is being set up at Delhi and a special cell has been created for the purpose.

2.42.2 During Fifth and Sixth Plan periods, it is proposed to continue and expand the existing programmes. Since the development of handicrafts is mainly dependent on the ready market for the goods produced, it is proposed to set up more emporia one each at Bombay and Calcutta during the Fifth Plan and at Madras and Secunderabad during the Sixth Plan.

2.42.3 It is proposed to undertake special measures for the development of certain handicrafts such as manufacture of wooden blocks for cloth printing, dyeing technology, wood-carving, mechanisation of certain processes under agate industry, development of embossing on garments, leather, ceramics, etc. It is also proposed to expand the activities of the State Design Centre for development of terracota toys.

2.42.4 It is expected that as a result of the above programme, it would be possible to provide gainful employment to 600 persons during the Fifth Plan and 1000 persons during the Sixth Plan.

2.42.5 As against the provision of Rs. 13 lakhs for handicrafts during Fourth Plan, it is proposed to provide Rs. 30 lakhs during Fifth Plan and Rs. 40 lakhs during Sixth Plan.

Coir

2.43 Since this industry has not developed well, except in the coastal areas having coconut plantations, a provision for imparting training in coir-weaving and net-making has been made during the Fourth Plan. It is proposed to continue the training programme during the Fifth and Sixth Plans. Financial provision which is Rs. 50,000 for the Fourth Plan, would be to the tune of Rs. 60,000 during the Fifth Plan and Rs. 70,000 during the Sixth Plan.

2.44 Cottage Industries

2.44.1 There are 37 main cottage industries of the State. It is not proposed to list them here as the list would be too unwieldy. It may be mentioned here that the State Khadi Gramodyoga Board grants financial assistance to the village industries covered by them provided these industries approach them for assistance either as a co-operative society or as institutions registered under the Societies Registration Act of 1860 The individuals are assisted by the Co-operative Department under the State Aid to Industries Rules, 1935 while co-operatives are also assisted likewise if the Board does not assist them.

2.44.2 The artisans are encouraged to organise co-operatives wherever possible. The various schemes under the programme for development of cottage industries concern mainly grant of financial assistance to the industrial co-operatives and individuals for purchase of machinery and tools as also grant of block fund and working capital for construction of work-sheds and godowns and for establishment of rural workshops. District Training Centres are also run for imparting training to the artisans. The Diamond Jubilee Cottage Industries Institute at Baroda has been imparting training in 15 trades to about 200 trainees every year.

2.44.3 During the Fifth and Sixth Plan periods, it is proposed to continue existing schemes and to expand or undertake the following schemes:—

(a) There is one co-operative society of diamond cutters at Visnagar. It is proposed to expand the activities of this society to provide employment to 2,000 persons during the Fifth Plan and 2,500 persons during the Sixth Plan period. It is also proposed to organise and assist 5 more societies during the Fifth Plan period and 5 more during the Sixth Plan period.

(b) It is proposed to develop the existing ayurvedic medicine manufacturing society and to organise two more societies during each of the Fifth and Sixth Plan periods. Each society is expected to provide employment to about 200 persons.

(c) It is proposed to organise 5 brick making and tiles making societies during the Fifth Plan and 5 more societies in the Sixth Plan.

(d) Besides organising co-operative societies for cottage industries, it is also proposed to organise co-operatives for small scale industrial units, such as societies for those engaged in chemical engineering, manufacturing of engineering goods, printing presses, production of building construction materials, etc.

(e) It is also proposed to organise co-operative societies for manufacturing scooters and their spare parts.

2.44.4 It is estimated that as a result of various programmes proposed to be undertaken in the Cottage Industries sector, during the Fifth and Sixth Plan periods employment will be provided to 4,000 and 5,000 additional persons respectively.

2.45 Thus, as against the financial outlay of Rs. 72.50 lakhs during the Fourth Plan period, it is proposed to provide Rs. 255 lakhs during the Fifth Plan and Rs. 310 lakhs during the Sixth Plan period.

2.46 The total Plan provision for the village and cottage industries programme during the Fifth and Sixth Plans would be to the tune of Rs. 478.40 lakhs (*i. e.* Rs. 452.60 lakhs under the State Plan schemes and Rs. 25.80 lakhs under centrally sponsored schemes) and Rs. 621.20 lakhs (*i. e.* Rs. 570.20 lakhs under State Plan schemes and Rs. 51 lakhs under Centrally Sponsored schemes) respectively. The details about the provisions under various sub-groups are given in Statement III.

This will generate additional employment of over 26,000 persons in the Fifth Plan and around 45,000 persons in the Sixth Plan.

Kandla Free Trade Zone

2.47 The Kandla free trade zone established by the Government of India is spread over an area of 130 hectares in the first phase which will be later on expanded to 284 hectares. At present, there are 16 industrial sheds and 200 open plots of various sizes. The zone has infrastructure facilities of road, water, pipelines, underground sewage system, storm water drainage, railway siding and high tension and low tension pipelines. However, the zone has not developed to our expectations. To take the best advantage of the facilities offered by the zone, industries could be planned as discused in the subsequent paragraphs.

Machine Tools

2.48 There is a very good scope for manufacture of conventional machine tools with an export angle, provided we are able to produce them at low price and with good quality. Such a unit could be established with an investment of Rs. 10 crores and it would earn foreign exchange of Rs. 5 crores per year. We have additional advantage of availability of cheap and skilled labour to support such an industry. Such a unit could also manufacture sophisticated machine tools, which have limited demand, as its production is not undertaken by the developed countries because of high cost of labour.

Electronics

2.49 Another industry that could be planned in the zone could be production of electronic instruments and audio-visual equipment because of the skilled and cheap labour. Such an industry would require an investment of Rs. 2 to 3 crores, provided we are able to manufacture the components on large scale. A modest beginning could be made by import of CKD parts, in which case the assembly investment may not exceed Rs. 30 to 35 lakhs. It should be possible to earn an equivalent foreign exchange to cover the import of such parts.

Cast Iron and Malleable Iron Foundries

2.50 In developed countries the production of conventional items is out of date. The spun pipes and malleable casting industry is a labour-intensive industry. In Gujarat, we have a number of foundries with the result that skilled labour is available. Therefore, there is a good scope for automatic foundry to manufacture spun pipes and also to undertake multiple castings. Such a unit would be established in the zone with complete heat treatment equipment with an investment of Rs. 4 crores and foreign exchange earning out of such a project would be around Rs. 2 to 2½ crores per annum.

Soda Ash

2.51 Gujarat is very rich in salt and its contribution is nearly 60 per cent of the country's production of salt. The export is dwindling because of the low loading rates and higher ocean freights. It would, therefore, be advantageous to export chemicals based on salt, which will be able to absorb the high cost of transportation. A soda ash unit of 500 tonnes capacity per day could be established in the zone with an investment of Rs. 15 crores. Such a unit would start earning foreign exchange within a short period.

Public Sector

2.52 At present, the public sector investment in the State is very limited. With the implementation of the Petrochemical Complex, sizable growth will take place in the public sector. However, there are many other industries, which offer good scope for public sector investment in Gujarat, taking into account the special advantages of this region in the matter of raw materials, availability of skilled labour and special access to export markets. Some of these industries are ordnance factory, machine tools unit, export-oriented cement / soda ash plants, telephone industry, etc. The Government of India should consider setting up of these industries in right earnest.

RESEARCH AND DEVELOPMENT

(A) Existing Facilities

2.53 Chemical Testing

The Central Salt and Marine Chemical Research Institute, Bhavnagar.—This is an institute under the Council of Scientific and Industrial Research (CSIR). It is primarily devoted to research on marine chemicals and salt. It is proposed to utilise its spare capacity for other industrial research.

2.53.1 The State Government has under the control of Industries Commissioner, a research and testing laboratory, popularly known as Industrial Research Laboratory, at Baroda. It has facilities for testing of ores, minerals, oils, oil cakes, soaps, inks, metals, alloys, paints and varnishes and other miscellaneous chemicals. This laboratory is approved by the Indian Standards Institute for testing of chemicals. A quality marking scheme is operated at the laboratory for selected products made by the small scale industries of the State. At present, seventeen items are under the scheme. Laboratory facilities to technical personnel for carrying out their own research or investigation work on pilot plant scale for establishing conditions for commercial production are available on payment of a very nominal service charge. The laboratory has a Patent Inspection Centre where the specifications of Indian patents are available for reference freely to the interested entrepreneurs. On request, technical information is provided free of charge to any person. It has a technical library having reference books, particularly in the chemical fields. Saurashtra Oil Millers Association has a fairly good testing laboratory at Jamnagar which is primarily devoted to the testing of oil-seeds. The Drugs Control Administration has a well equipped laboratory at Baroda with five main divisions, *viz*.,

1. Pharmaceutical Division

2. Microbiology Division

3. Pharmacology Division

4. Pharmacognosy Division

5. Immunology Division

2.53.2 This laboratory is equiped to test all types of drugs, antibiotics, vitamins, hormones, immunological products, contraceptive aids, food, crude drugs as also colours and cosmetics. The present capacity of the laboratory is to analyse 2,000 samples per annum. It is proposed to double its present capacity. This laboratory not only carries out testing work but also devotes itself to development work such as devising new analytical methods for new combinations and also research work.

2.53.3 The Director of Health and Medical Services (Public Health) has a laboratory at Baroda for testing of food products and other edible materials. The Central Public Health Engineering Research Institute, Nagpur has its regional centre at [illegible] devoted to problems arising out of industrial effluents and obnoxious [illegible]

2.53.4 The Physical Research Laboratory at Ahmedabad is devoted to research in space, physical science and related problems. The Foundry Research Station is a branch of the National Metallurgical Laboratory, Jamshedpur. It has facilities to test all the raw materials and finished goods connected with foundry industry.

2.53.5 For the quality marking scheme for diesel engines, facilities have been created at the Proto-type Training Centre, Rajkot with an investment of Rs. 1.00 lakh in the testing equipment. The Small Industries Service Institute has extension centres in Jamnagar, Bhavnagar, Surat, Nadiad, and Savarkundla with equipments required for the small industries of the concerned areas. Gujarat contributes 30 per cent of the textile production of the country and has two research institutions in the field :—

(1) ATIRA at Ahmedabad and
(2) TAIRO at Baroda.

2.53.6 ATIRA is a co-operative research centre assisted by CSIR.

2.53.7 Over and above these, there are private research laboratories of big industries such as Sarabhai Group, Jyoti, Atul, etc.

2.53.8 The small scale industries contribute over 30 per cent of the total machine tools produced in the State. With a view to assisting them as also to cater to the export market, it is proposed to have a research centre for development of sophisticated machine tools. The Directorate of Industries will have a precision laboratory to verify secondary standards of weights and measures under the Weights and Measures Enforcement Act, 1958.

(B) Needs of the Coming Decade

2.53.9 Chemical and engineering industries which will contribute to the industrial development very significantly in the coming decade, will require research and development facilities. It is proposed to have the following institutions :—

1. Regional Research Laboratory on the line of the one at Hyderabad (CSIR).
2. Polymer Research Centre.
3. Glass and Ceramics Research Centre.
4. Cement Testing and Research Institute.
5. Sugar Research Institute.
6. Man-made Fibre Research Institute.
7. Tool Room and Electronics Facility Centre.

Regional Research Laboratory

2.53.10 In the Industries Plan of 1974-84, various sectors which contribute to the economy of the State have been indicated. However, there is an acute need for a full-fledged research laboratory which can undertake research on utilisation of some of the material resources available in the State. Its main function will be to assist the development and research on chemical industries, as special institutes are envisaged for some of the important branches of other industries. Such an institute would need approximately Rs. 2 crores over a decade out of which 50 per cent can be had by way of assistance from the CSIR.

Polymer Research Centre

2.53.11 With the olefins project to be commissioned in Gujarat, we would be one of the prime producers of resins, such as polyethylene (high density and low density) PVC, polysteyrene, nylon, ABS, etc. In the developed countries, co-polymers and resins have replaced metals and help find new materials of construction for chemical plants and equipment *e. g.* poly-tetra flouro ethylene (PTFE). Not only for developing new products, but also for efficient use of these resins in the various small, medium and large sectors, a technical institution which can

fully meet with the demand has to be planned. Such an institute would cost about a crore of rupees and could be established as an extension centre to one of the Universities of the State.

Glass and Ceramics Research Centre

2.53.12 Gujarat has 10 large scale and over 200 small scale industries producing various products of glass and ceramics. In small scale sector it ranks as one of the foremost in the country. The State is also endowed with good qualities of fire-clay, bauxite, china-clay as also other raw materials required for these industries. It is, therefore, appropriate that we aspire to establish an institute to undertake research for the manufacture of glass and ceramics. Incidentally, associated/natural gas is a boon for undertaking this work. Gas produced in Gujarat is very aptly suited for this work as it is free from sulphur (hydrogen sulphide). Such an institute can be established near one of the gas fields of the State and would need about Rs. 50 lakhs for a modest beginning over the decade.

Cement Testing and Research Institute

2.53.13 Gujarat produces 14 per cent of the cement of the country and has an immense potential for its vast additional production. Extensive lime-stone deposits have been found in Kutch and Saurashtra and it is necessary that a full-fledged cement testing research institute is established in the State so as to ensure proper quality to consumers of cement. Such an institute would need approximately Rs. 50 lakhs over the decade.

Sugar Research Institute

2.53.14 Sugar-cane is one of the 4 major agricultural cash crops. There was very limited production of sugar when the State was formed in 1960. There are at present 11 sugar mills established or under implementation with a crushing capacity of 18,000 tonnes per day. With the commissioning of Ukai and Kakrapar irrigation projects, there is an immense potential for additional production of sugar-cane in Gujarat. It is possible to encourage about 16 to 20 new sugar factories in this area. Sugar-cane is also grown by well irrigation. The per capita consumption of sugar in Gujarat is the highest in India. Even with twenty more sugar mills being established in the coming decade it is feared that we will not be able to meet with our requirements. Any improvement that can be had through research and development as a result of assistance from a technical institution would be always welcome. This institute also can undertake utilisation of the by-products like molasses and bagasse. For making a modest beginning this would need approximately a crore of rupees over the decade

Man-made Fibre Research Institute

2.53.15 With the commissioning of Udex, Aromatics and Olefins Projects, we will have basic raw materials from which we will be able to manufacture three important man-made fibres (1) Nylon (2) Polyester and (3) Acrylonitrile. Acrylonitrile is a substitute for wool. Nylon as a fibre, is known to us for quite some time. However, to use all these fibres efficiently, it is very necessary to have an institute which technically guides production by the latest methodology. A composite research centre would need approximately a crore of rupees.

Tool Room and Electronic Facility Centre

2.53.16 With the tremendous progress envisaged in the engineering industry, there will be heavy demand of dyes, tools, jigs, fixtures, inspection gauges, etc. It will therefore be necessary to plan for an up-to-date tool room to provide the necessary facilities for the development of the industries. It is suggested that one up-to-date tool room may be set up at Ahmedabad with a capital investment of Rs. 1 crore for machinery, equipment, tools and premises. Two medium sized tool rooms, one in Saurashtra and the other in Central Gujarat, with a capital investment of Rs. 50 lakhs each may also be set up. They have been suitably indicated in the engineering section.

CHAPTER III

INFRASTRUCTURE

Engineering, Chemical and Petro-chemical Industry

3.1. The requirement of power, water, transport and finance for the different industries in the 4 Regions of Gujarat is given in Schedules 'A' and 'B'. The State has been divided into 4 regions, *viz.* Ahmedabad Region consisting of Ahmedabad, Mehsana, Sabarkantha and Banaskantha districts; Baroda Region consisting of Baroda, Broach, Kaira and Panchmahals districts; South Gujarat region consisting of Surat, Bulsar; and the Saurashtra Region consisting of the 6 districts of Saurashtra and Kutch.

Land

3.2 The detailed location of industries in the different districts of these regions is not possible to be indicated at this stage. Advance action, therefore, for acquisition of land is not possible, but certain growth centres can be identified where additional land can be acquired or earmarked for the location of the new industries. The exact requirements of land have therefore not been stated in the Schedules. It is, however, recommended that in Sourth Gujarat additional land should be acquired at Surat, Bulsar and Vapi where many of the proposed industries in the Fifth and Sixth Plans are likely to come up in view of the existing facilities for water and power. Advance action has already been taken by the GIDC for earmarking/acquiring of land in these areas.

Process Water

3.3 It will be seen from the Schedules 'A' and 'B' that the total requirement of water for the engineering industry in Ahmedabad region in Fifth and Sixth Plans is about 19,50 kld (0.43 mgd), while for chemical industry it is 53,600 kld (11.8 mgd). The bulk of this requirement is that of I. F. F. C. O. which will come up at Kalol and is estimated at 318,00 kld (7 mgd). The GIDC has already made adequate arrangements for supply of water and the remaining requirement of 23,800 kld (5.23 mgd) can easily be made up by underground resources of water. Incidentally it may be added that it is expected that I. F. F. C. O.'s fertilizers plant at Kalol will come up during the Fourth Plan itself and not in the Fifth Plan and, therefore, the total requirement of water for all types of industries in the Ahmedabad region for the Fifth and Sixth Plans is only 23,800 kld (5.23 mgd) which can be adequately made up as stated earlier. The total requirement of water in the Baroda region for engineering industry in the Fifth and Sixth Plans is 3,400 kld (0.75 mgd) and 84,000, kld (18.5 mgd) for the petro-chemical, chemical and all other non-engineering industries. The GIDC has already gone ahead with the implementation of 45,000 to 55,000 kld (10 to 12 mgd) water supply scheme for the petro-chemical complex near Baroda and has got plans for expansion of the scheme to 91,000 kld (20 mgd). Hence the requirments of water will be adequately met for the Baroda region. As far as the South Gujarat region is concerned, the requirement of water for engineering industry is 3,000 kld (0.68 mgd) and for petro-chemical and chemical industries it is 3,50,000 kld (78.59 mgd). The GIDC is already starting a 45,000 (10 mgd) water supply scheme for Vapi and adequate water will be available near Surat from the Ukai canal, and therefore, no difficulty regarding water is anticipated in the South Gujarat region. The total requirement of water for the engineering industry in the Saurashtra region is 2,800 kld (0.62 mgd) and for chemical and petro-ehemical industries it is 1,50,000 kld (34.7 mgd). At present industrialisation of Saurashtra is considerably affected due to the paucity of water. Underground water resources in the Saurshtra region are extremely limited and one has to rely on surface water mainly from dams. It is not possible to meet such a gigantic requirement of water as 1,60,000 kld (35 mgd) without going in for a nuclear power station with facilities for desalination of sea water. The bulk of the chemial industries which incidentally are mainly salt-based will have to grow around the nuclear power station to be located at a suitable place on the Saurashtra coast. The engineering industry will be

Kld=kilolitres per day; mgd=million gallons per day.

located all over Saurashtra region and, therefore, there is an urgent need for augmenting sources of water at Rajkot, Bhavnagar, Jamnagar and other growth centres. The working group feels that the Government should, in collabortion with municipalities, draw up schemes for augmenting the existing sources of water and locating and developing new sources of water in these growth centres so that paucity of water does not act as a constraint on the development of industries in the Saurashtra region.

Water for Townships

3.4 Several townships are bound to develop along with or around the bigger industrial projects. While requirements of process water for chemical and engineering industries has been calculated separately, it is also necessary to assess the requirements of water for such townships. In the two Plans the investment is expected to create approximately 7.3 lakh direct jobs On the basis of a family per job consisting of 5 members and on an assumption that 0.45 kld (100 gallons) would be needed per family per day, we would need approximately 3,30,000 kld 73 million gallons of water per day for industrial townships It is expected that, by and large, it would be taken care of by additional per capita consumption considered by the appropriate Public Health group, but it needs to be emphasized here that it would be difficult to attract large scale industries to the State unless adequate supply of water is made available for such townships in addition to the requirement of the industries proper.

3.5 Effluents

3.5.1 Additional water intake in the chemical industries is 1,50,000 kld (33 mgd) in the Fifth Plan and 5,00,000 kld (110 mgd) in the Sixth Plan. On the basis of 90 per cent of the intake to be discharged as effluent by various chemicals, we will have an effluent disposal problem to process additional 4,50,000 kld (100 million gallons of water per day). While selecting locations for the new industries, every effort should be made to see that they are in the vicinity of rivulets where process water and effluents could be discharged after treatment to specified standards to ensure that no deleterious effects follow as a result of the effluent discharge into the river streams Adequate additional land would have to be considered for such of the industries established in the interior of the State where effluent cannot be discharged easily.

3.5.2 Effluent disposal, particularly because of the several advances in technology, presents *a complex and difficult problem and would need organised research on a continuing basis to help* industry find satisfactory solutions for treatment of its disposal. The State already has a centre of the Central Public Health Research Institute at Ahmedabad, but this will have to be augmented considerably particularly keeping in view the massive growth of chemical industries that is envisaged in the Plans.

This Working Group feels that the problem of effluent disposal would be studied in depth by the Sub-group on Pollution of Water.

3.6 Telephones

3.6.1 Telephone facility is one of the most important infrastructure as required for modern industry. Unless an industrial unit has telephone facility, it will be severely handicapped in procuring raw materials as well as in selling its goods. Adequate telephone facility is, therefore, sought by all industries even before they are started. This is true, not only of large scale industries, but, also of the medium scale and to a considerable extent of small scale units. The experience in Gujarat, however, is that this basic facility is woefully inadequate. Even for small industries *it is estimated that about 7500 applications are pending. Therefore, for the rapid growth of industries* as visualised for the Fifth and Sixth Plans, it is absolutely essential that the telephone authorities become more alive to the importance of this facility for successful functioning of industries and not only strive but ensure in time strengthening of the existing exchanges, opening new exchanges, procuring sufficient stores, etc. so that telephones could be installed no sooner the industry requires them.

3.6.2. While preparing the estimate for the requirement of telephones, it has been assumed that three telephones would be needed per Rs. 1 lakh investment in small scale sector. On that

basis Gujarat would need 23,000 telephones in the Fifth Plan and 32,000 telephone lines in Sixth Plan, over and above the requirements of the large scale industries. For large scale it is proposed to have individual PBX limited to maximum 30 telephone lines per unit. Fifth Plan requirement does not include the present backlog of 7,500 telephones.

Power

3.7 The requirement of power for different industries depends upon the techn but on certain assumptions which are indicated in the Schedules A and B, the power have been worked out. It will be seen from the report of the Power S additional generating capacity for industry during the Fifth Plan will be of MW. The additional requirement of power in Fifth Plan for industries will corresponding additional capacity in the Sixth Plan will be of the order requirement of power for the industries will be 1215 MW. It will the proposed planning of power may be mariginally inadequate to n assuming a diversity factor of 1.2. However, if there is significant improvement of load and power factor, the power requirements m however. be quite appropriate to sound a note of caution and s the power situation so that long range corrections could be appl

3.8 Transport

3.8.1 The transport requirements have been worked cent by road, 50 per cent by sea and 30 per cent by rail f regions the transport requirements are divided on 50:50 truck can take an average load of 5 tonnes by weight and transport 18 tonnes average of engineering items and total requirements of transport per annum have been number against each item by 300, representing 30

3.8.2 The distribution of transport between Saurashtra, on 50:50 basis has been made tak The recent survey conducted by the Sardar indicated the inter-regional movement of goods . This does not take into account the internal movem Moreover, on enquiry from the Institute, it has been indic as the study is based on the movement pattern of 10 industrial p in only one month of the year, which would not be representative. It movement into and outside the State could be substantially higher.

3.8.3 Considering the facts that a substantial movement of products particular chemical sector would be *inter se* between the existing units, and the end product would u tely go outside the State and the incoming movement of raw materials is limited excepting for the engineering industry, it would be reasonable to assume a division between the rail and road movement on a 50:50 basis. Another factor responsible for diverting the traffic from railway and road would be th serious bottleneck on the railway for accommodating the additional rolling stock, capacity and other facilties required for taking on the increased movement in the Fifth and Sixth Plans within the overall rail movement and facilities to be created all over the country. Movements by road, rail and sea are shown in Schedules 'A' and 'B'.

Investment

3.9 It will be seen from the Schedules that the industries will require funds for fixed assets, working capital margin and for working capital as indicated in Schedules 'A' and 'B'. The working capital will come from the banking sector. Out of the total funds required for fixed assets and the working capital a margin of 40 per cent may come by the way of equity from the industrialists and the remaining 60 per cent by way of loans. These loans will come from the different financial institutions in the country. As the requirement of finance for all these industries is very large, timely action will have to be taken for augmenting the resources of the financing institutions in the State.

SCHEDULE 'A'

ENGINEERING INDUSTRY INFRASTRUCTURE SUMMARY

All data is additional requirements for Fifth and Sixth Plan periods

Sr. No	Name of area	Water kld (mgd)	Additional requirement of labour (employment) numbers	Communication (number of telephones)	Transport facilities required: Number of trucks per day	Per day tonnage for ship	Wagons per day	Investment required (Rs. in lakhs): Fixed assets	Working capital	Total investment
1	2	3	4	5	6	7	8	9	10	11
	Fifth Plan									
1	Ahmedabad area ..	600 (0.14)	9,834	457	56		16	5,104.00	1276.00	6,380.00
2	Baroda area ..	800 (0.17)	10,832	290	25		7	2,898.00	724.50	3,622.50
3	South Gujarat area ..	400 (0.09)	6,505	350	24	..	10	3,774.00	943.50	4,717.50
4	Saurashtra area ..	800 (0.17)	14,429	470	51	638	20	6,754.00	1,688.50	8,442.50
5	Undecided ..		3,400					1,100.00	275.00	1,375.00
6	Small Scale ..		73,590					3,053.00	763.25	3816.25
	Total for the State of Gujarat .	2,600 (0.57)	1,18,800	1,567@@ *	156	638	53	22,683.00	5,670.75	28,353.75
	Sixth Plan									
1	Ahmedabad area ..	1,300 (0.29)	14,747	553	69		20	5,520.00	1,380.00	6,900.00
2	Baroda area .	2,600 (0.58)	23,113	450	32		0	5,150.00	1,287.50	6,437.50
3	South Gujarat area ..	2,700 (0.59)	20,270	549	82		34	10,600.00	2,650.00	13,250.00
4	Saurashtra area ..	2,000 (0.45)	23,643	531	129	1,372	46	15,592.00	3,898.00	19,490.00
5	Undecided ..		4,450					3,200.00	800.00	4,000.00
6	Small Scale ..		90,085					4,649.00	1,162.25	5,811.25
	Total for the State of Gujarat ..	8,600 (1.91)	1,91,310	2,083@@ **	312	1,372	100	44,711.00	11,177.75	55,888.75

@@ Telephone requirements for small scale industries.
* Fifth Plan : 23,000 Numbers.
** Sixth Plan : 32,000 Numbers.
(It is not possible to indicate the regional distribution as the small scale industries would be established anywhere in the State).

basis Gujarat would need 23,000 telephones in the Fifth Plan and 32,000 telephone lines in the Sixth Plan, over and above the requirements of the large scale industries. For large scale units it is proposed to have individual PBX limited to maximum 30 telephone lines per unit. The Fifth Plan requirement does not include the present backlog of 7,500 telephones.

Power

3.7 The requirement of power for different industries depends upon the technology adopted but on certain assumptions which are indicated in the Schedules A and B, the requirements of power have been worked out. It will be seen from the report of the Power Sub-group that the additional generating capacity for industry during the Fifth Plan will be of the order of 1015 MW. The additional requirement of power in Fifth Plan for industries will be 1190 MW. The corresponding additional capacity in the Sixth Plan will be of the order of 985 MW while the requirement of power for the industries will be 1215 MW. It will therefore be seen that the proposed planning of power may be mariginally inadequate to meet needs of industries assuming a diversity factor of 1.2. However, if there is significant increase in diversity or improvement of load and power factor, the power requirements may be just met. It would however. be quite appropriate to sound a note of caution and suggest a continuing review of the power situation so that long range corrections could be applied.

3.8 Transport

3.8.1 The transport requirements have been worked out on the basis of 2:5:3, i.e., 20 per cent by road, 50 per cent by sea and 30 per cent by rail for the Saurashtra region, while for other regions the transport requirements are divided on 50:50 for road and rail. It is assumed that a truck can take an average load of 5 tonnes by weight and volume and a wagon of broad gauge can transport 18 tonnes average of engineering items and 30 tonnes average of chemical items. The total requirements of transport per annum have been broken up per day by dividing the total number against each item by 300, representing 300 working days of effective production.

3.8.2 The distribution of transport between the road and rail for the Gujarat area, excluding Saurashtra, on 50:50 basis has been made taking the following factors into consideration :— The recent survey conducted by the Sardar Patel Institute for Social and Economic Studies has indicated the inter-regional movement of goods from and into Gujarat as 17 per cent by road. This does not take into account the internal movement within the State by truck transport. Moreover, on enquiry from the Institute, it has been indicated that these figures are conservative as the study is based on the movement pattern of 10 industrial products and on actual movement in only one month of the year, which would not be representative. It was indicated that the actual movement into and outside the State could be substantially higher.

3.8.3 Considering the facts that a substantial movement of products particularly in Petro-chemical sector would be *inter se* between the existing units, and the end product would ultimately go outside the State and the incoming movement of raw materials is limited excepting for the engineering industry, it would be reasonable to assume a division between the rail and road movement on a 50:50 basis. Another factor responsible for diverting the traffic from railway and road would be the serious bottleneck on the railway for accommodating the additional rolling stock, capacity and other facilties required for taking on the increased movement in the Fifth and Sixth Plans within the overall rail movement and facilities to be created all over the country. Movements by road, rail and sea are shown in Schedules 'A' and 'B'.

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3.9 It will be seen from the Schedules that the industries will require funds for fixed assets, working capital margin and for working capital as indicated in Schedules 'A' and 'B'. The working capital will come from the banking sector. Out of the total funds required for fixed assets and the working capital a margin of 40 per cent may come by the way of equity from the industrialists and the remaining 60 per cent by way of loans. These loans will come from the different financial institutions in the country. As the requirement of finance for all these industries is very large, timely action will have to be taken for augmenting the resources of the financing institutions in the State.

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5	Undecided		3,400					1,100.00	275.00	1,375.00
6	Small Scale		73,890					3,053.00	763.25	3816.25
	Total for the State of Gujarat	2,600 (0.57)	1,18,890	1,567@@ *	156	638	53	22,683.00	5,670.75	28,353.75
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2	Baroda area	2,600 (0.58)	29,113	450	32		9	5,160.00	1,287.50	6,437.50
3	South Gujarat area	2,710 (0.59)	29,270	549	82		34	10,600.00	2,650.00	13,250.00
4	Saurashtra area	2,000 (0.45)	23,645	631	129	1,372	46	15,892.00	3,898.00	19,490.00
5	Undecided		4,450					3,200.00	800.00	4,000.00
6	Small Scale		90,085					4,649.00	1,162.25	5,811.25
	Total for the State of Gujarat	8,600 (1.91)	1,91,310	2,083@@ **	312	1,372	109	44,711.00	11,177.75	[illegible] 75

@@ Telephone requirements for small scale industries.
* Fifth Plan : 23,000 Numbers.
** Sixth Plan : 32,000 Numbers.
(It is not possible to indicate the regional distribution as the small scale industries would be established anywhere in the State).

Estimates of infrastructure facilities for Engineering Industry in the Gujarat State during the Fifth and Sixth Plan periods

Basis of Estimation

(1) *Power.*—Power requirements are based on ' Industries Programme for Fourth Plan, Gujarat' prepared by the National Council for Applied Economic Research, New Delhi.

(2) *Water.*—As regards water requirements, it is assumed that each labourer in engineering industry would require about 0.10 kld (20 gallons of water per day).

(3) *Employment.*— Data regarding labour requirements for each industry is based on the basis of information furnished by the Industries Commissioner's office, *vide* letter No. DW/PLN/71-72/SG-1/7265 dated 2nd September 1971.

(4) *Communication.* — Communication requirements are based on three telephones per Rs. 1 lakh investment in small scale sector and 30 telephones with a board have been envisaged per large scale unit in engineering and chemical industries indicated in the Schedule 'A'. This figure relates only to the external lines that will be required. The internal requirement can be estimated on the basis of the internal distribution of telephones in existing industry. This does not take into account the requirement of intercom facilities within the industry as this may vary from unit to unit.

(5) *Transport.*—Transport requirements have been worked out on the bais of 2:5:3 *i. e.* 20 per cent by road, 50 per cent by ships and 30 per cent by railway for the Saurashtra region, while for other regions the transport requirements are divided on 50:50 basis for road and railways.

Since the capacities are not given in the documents all on tonnage basis, following assumptions have been made to convert those figures which were other than tonnes :—

(*a*) 100 kva=1 Tonne of material.

(*b*) 100 HP=1 Tonne of material.

(*c*) 10,000 numbers of medium and small items will make available a tonne of material.

(*d*) Rs. 10,000 worth small and medium items will make available a tonne of material.

(*e*) Heavy engineering goods which are given in numbers are converted into tonnes considering the physical volume and nature of such items.

It is assumed that a truck can take a load of 5 tonnes, while a wagon of broad gauge can transport 18 tonnes at a time. and that the metre gauge wagon can move only 12 tonnes. The total requirements of transport per annum have been broken into per day requirements by dividing the total numbers against annual numbers by 300, which is assumed to be the number of working days per annum.

(6) *Investment.*—The total investment required have been broken up into—

(1) Fixed assets, and

(2) Working capital on the basis of 25 per cent of the value of fixed assets.

Total investment : Total of 1 and 2

The investment figures are based on the information collected from the Industries Commissioner's office records.

SCHEDULE 'B'

PETRO-CHEMICAL, CHEMICAL AND NON-ENGINEERING INDUSTRY INFRASTRUCTURE SUMMARY

All data is additional requirements for Fifth and Sixth Plan periods

Sr. No	Region	Water kld (mgd)	Employment (numbers)	Communication (number of telephones	Transport: Truck Nos	Transport: Ship tonne	Transport: Railway wagon Nos/day	Investment (Rs. in crores): Fixed assets	Investment (Rs. in crores): Working capital	Investment (Rs. in crores): Total investment
1	2	3	4	5	6	7	8	9	10	11
	Fifth Plan									
1	Ahmedabad	38,000 (8.5)	3,315	187	152 (2,23,104)	Nil	25 (2,26,104)	132.93	33.23	166.16
2	Baroda	25,000 (5.4)	4,773	748	89 (1,33,720)	Nil	15 (1,33,720)	101.95	6.01	107.96
3	South Gujarat	13,000 (2.9)	7,170	285	59 (88,187)	Nil	10 (88,187)	130.60	32.65	163.25
4	Saurashtra	76,000 (16.7)	55,197	308	564 (8,45,708)	(21,14,270)	352 (12,68,562)	91.92	47.98	239.90
	Small Scale		40,700	—	—	—	—	39.10	0.77	48.87
	Total	1,52,000 (33.5)	1,20,165	1,528	864	21,14,270	402	590.50	120.64	726.14
	Sixth Plan									
1	Ahmedabad	15,000 (3.3)	3,895	216	79 (1,18,416)	Nil	13 (1,18,416)	44.90	11.22	56.12
2	Baroda	60,000 (13.1)	8,110	1,087	165 (2,57,349)	Nil	27 (2,57,349)	184.75	46.19	230.94
3	South Gujarat	67,000 (14.6)	12,870	350	152 (2,26,749)	Nil	25 (2,26,749)	230.15	57.54	287.69
4	Saurashtra	82,000 (18.0)	[illegible]	310	490 (7,35,533)	(18,39,583)	307 (11,03,750)	129.35	32.34	161.69
	Small Scale		64,000	—	—	—	—	51.40		
	Total	2,22,000 (48.9)	1,20,950	2,002	880	18,39,533				

Estimates of Infra-structure for petro-chemical, chemical and non-engineering industries in Gujarat during Fifth and Sixth Plan periods

Basis of Estimation

(1) *Power.*— Power requirements are based on following units of consumption :—

(a) *Petro-Chemicals*:

		kWh / Tonne
(a)	Thermoplastics	1500
(b)	Synthetic fibre	4000
(c)	Synthetic rubber	1000
(d)	Intermediates for plastics and synthetic fibre	1500
(e)	Chemicals	1000
(f)	Insecticides and pesticides	1000

(b) *Chemical non-engineering industries* :

(a)	Caustic soda	4500
(b)	Industrial explosives	1000
(c)	Fertilizer	2000
(d)	Aluminium	3000
(e)	Cement	125
(f)	Others	200

(2) *Water.*—On an average about 30 kl (6600 gallons) is taken per tonne of petrochemical products and chemicals. For caustic soda, MMA and similar industries a higher consumption at 70 kl (15,400 gallons) per tonne is taken. For items like glass, vegetable oil, vanaspati, etc. 10 kld (2,200 gallons) is taken per tonne of product.

(3) *Employment.*—Data regarding labour requirements for each industry is based on the basis of information furnished by the Industries Commissioner's office vide letter No. DW/PLN /71-72,SG-1 / 7265, dated 2nd September, 1971.

(4) *Communication.*—Communication requirements are based on three telephones per Rs. 1 lakh investment in small scale industries sector and 30 telephones with a board have been envisaged for every large scale unit in engineering and chemical industries indicated in the Schedule. This figure relates only to the external lines that will be required. The internal requirement can be estimated on the basis of the internal distribution of telephones in existing industry. This does not take into account the requirement of intercom facilities within the industry as this may vary from unit to unit.

(5) *Transport.*—Transport requirement is divided on 50:50 basis, 50 per cent transport by trucks and 50 per cent by railways. Capacity of each truck is taken as 5 tonnes and for railways 12 tonnes per metre gauge wagon and 30 tonnes per broad gauge wagon. For Saurashtra region a ratio of 2 : 5 : 3 *i. e.* 20 per cent by trucks, 50 per cent by ships and 30 per cent by railway has been taken.

(6) *Investment.*—The total investments required have been broken up into :

(1) Fixed assets, and

(2) Working capital on the basis of 25 per cent of the value of fixed assets.

Total investment : Total of 1 and 2.

The investment figures are based on the information collected from the Industries Commissioner's office records.

... ities required during the Fifth and Sixth Plan periods in the State

Textile Industry

Name of area	No. of new units	Additional requirement of labour employment Nos.	Transport facilities: Number of trucks per day	Transport facilities: Per day tonnage for ship	Transport facilities: Wagons per day	Communications (No. of telephones)	Investment required (Rs. in crores): Fixed assets	Investment required (Rs. in crores): Working capital	Investment required (Rs. in crores): Total investment
1	2	3	4	5	6	7	8	9	10
Fifth Plan									
1. Ahmedabad area		..	102	..	12	300	96.70	24.17	120 87
2. Saurashtra area		..	6	..	1	..	6.64	1 66	8 30
3. Baroda area ..		.	17	..	2	.	8 20	2 05	10 25
4. South Gujarat area ..		.	11		1	.	8.46	2 11	10 57
Total for the State of Gujarat			136	.	16	300	120 00	29 09	149 99
Sixth Plan									
1. Ahmedabad area ..	14	8,400	6		2	70	53 00	13 00	66 00
2. Saurashtra area ..	13	7,800	6		2	65	49 00	12 50	61 50
3. Baroda area ..	10	6,000	5		2	50	38 00	9 50	47 50
4. South Gujarat area ..	16	9,600	7	.	3	80	60 00	15.00	75.00
Total for the State of Gujarat ..	53	31,800	24	..	9	265	200 00	50 00	250.00

Summary of Power Requirement of Gujarat During Fifth And Sixth Plan Periods

Group of Industry	Fifth Plan: kw	Fifth Plan: kvA	Sixth Plan: kw	Sixth Plan: kvA
1. Engineering industry (Large Scale) ..	94,000	1,34,000	2,01,000	2,87,000
2. Engineering industry (Small Scale) ..	2,12,000	3,03,000	2,05,000	2,93,000
3. Petrochemical, chemical and non-engineering	5,72,000	8,17,000	5,13,000	7,80,000
4 Textile ..	25,000	36,000	51,000	73,000
5. Agro Industries ..	4,76,000	6,80,000	4,20,000	6,00,000
6. Cottage Industries ..	47,000	67,000	37,000	53,000
Total	14,26,000	20,37,000	14,60,000	20,86,000

Assuming a diversity factor of 1 2

Generating capacity required = 1190 MW
(Gujarat Electricity Board Plan) = 1015 MW

Generating capacity required = 1215 MW
(Gujarat Electricity Board ...

CHAPTER IV

INCENTIVES TO INDUSTRIES

Recommendations

4.1 The State has attained the third rank among the industrially developed States in the country, both in terms of value added by production and in employment generated. This development has been made possible partly because of the healthy investment climate prevalent in the State, the business acumen of its people and the support, both financial and physical, provided by the State Government. While the existing schemes of incentives and assistance have been helpful in generating new investment in the developed areas of the State, there are still many and large areas where no industrial activity exists, as for instance, the entire eastern and northern tracts of Gujarat and large pockets in Saurashtra and Kutch. It would be in the interest of balanced industrial development to identify new potential growth points in these areas and develop them intensively during the Fifth and Sixth Plans. Four growth points spread over the four areas of South Gujarat, Central Gujarat, North Gujarat, Saurashtra and Kutch are proposed to be developed during the Fifth Plan, to be followed by intensive development of four additional growth points in the Sixth Plan.

Existing Incentives

4.2 The incentives provided by the State Government under its various schemes to accelerate industrial development can be briefly recounted as under :—

(*1*) *Sales Tax.*—Sales Tax concession is being granted to new industries on their purchase of machinery, raw materials, processing materials and packing materials for a period of 5 years provided the industries are established at a distance of not less than 24 kilometres from the municipal limits of Ahmedabad and Baroda and 16 kms. from the municipal limits of Surat, Rajkot, Bhavnagar and Jamnagar.

(*2*) *Octroi Duty.*—A number of municipalities have agreed to exempt new industries from octroi duty payment for 5 years. The State has directed nagar panchayats and the gram panchayats to exempt new industries from octroi on building materials, plants, machinery, stores, raw materials, etc. for a period of 5 years from the date of production or 7 years from the date of establishment whichever is earlier.

(*3*) *Stamp Duty.*—The State has reduced the rate of stamp duty on documents of mortgage without possession in respect of loans and advances executed by industrial units in favour of various State corporations, nationalised banks and other public sector financial institutions.

(*4*) *Supply of Machinery.*—The Gujarat Small Industries Corporation supplies the indigenous machinery up to a maximum limit of Rs. 2 lakh value to individual units on hire-purchase basis with attractive terms of payment and low rate of interest. For small scale units in backward districts and technicians coming under Technician Package Scheme of the Directorate of Industries, the hire-purchase terms are further liberalised.

(*5*) *Technicians Scheme.*—To enable technicians/engineers to set up their own industry, liberal finance up to Rs. 2 lakhs at concessional rate is available from Gujarat Industrial Investment Corporation. Under the package scheme, the Directorate of Industries provides financial assistance up to Rs. 10,000 at 3 per cent interest.

(*6*) *Power Rates.*—The State is one of the few with a single grid and a common tariff. A rebate is given for taking power supply at 33 kv and above and concession is available

to new industries for the first 5 years subject to specified condition. The Gujarat Electric Board offers concessional rates for industrial consumers taking high voltage supply duri 10 p. m. to 7 a. m. The rates during this period work out to only 5 paise per unit, 60-6 per cent of the normal. Power-intensive industries satisfying prescribed norms ar charged a flat rate of 7.25 paise per unit. Financial assistance by way of subsidy on th electric power consumption to small scale units is granted by the Directorate o Industries.

New Industries are exempted from the payment of electricity duty on power purchased for the first 5 years. Units generating their own power are exempted for 10 years. There is a provision for concessional rate of electricity duty for specified industries including small scale units and others Substantial expansions are also exempted from electricity duty for a period of 5 years under certain conditions.

(7) *Water.*—The charges for providing running water from the rivers have been kept nominal. Industries drawing running water either from notified or unnotified sources are exempted from payment of any charge except nominal licensing fee for a period of 5 years from starting date Cases of industries drawing water from the sources having advantage of recharge are decided on individual merit

(8) *Industrial Housing.*—Gujarat Housing Board, municipalities and co-operative societies of eligible workers and employers receive financial assistance for providing housing accommodation for industrial workers under the subsidized industrial housing scheme of the Government of India.

(9) *Purchase and Sales.*—The Gujarat Small Industries Corporation assists small scale units in importing raw materials and also selling their products. For export sales, Gujarat Export Corporation helps manufacturers in securing packing credit, post shipment credit and export finance against their export order.

(10) *Testing Facilities.*—A subsidy is granted to registered small scale units at the rate of 50 per cent of testing charges for getting their products tested in the approved test houses and laboratories. 50 per cent subsidy is also granted in the cost of testing equipment and apparatus purchase.

(11) *Backward Districts.*—10 districts-Banaskantha, Sabarkantha, Panchmahals, Kutch, Broach, Mehsana, Amreli, Junagadh, Surendranagar and Bhavnagar are declared industrially backward and industries setting up there are eligible for concessional finance from financial institutions. The Panchmahals district is eligible for Central Government outright grant or subsidy amounting to 1/10th of the fixed capital investment to new units of not more than Rs. 50 lakhs each.

Why more

4 3 With the development of the petro-chemicals and fertiliser industries in the State, a rge number of medium and small scale units in this sector are likely to come up in the Fifth and th Plans. The engineering industry will also get a considerable boost from this development cause of the demand for fabrication of machinery, metal work, etc. The projected development chemical, mineral-based and agro industries in the Fifth and Sixth Plans will involve consider- e entrepreneurial activity which will call for the State's support in a big way. The existing mes of the Government will not therefore be adequate to meet the accelerated pace of develop- t. Location of new industry has become very competitive and it has become a pattern among ndustrialised States to offer a package of incentives for promoting new industries in their region. Not only will the State have to catch up with the promotional activity adopted e other States (since it is admitted on all counts that our incentives do not match those led by many States), but will also have to be a few steps ahead, if it really intends to create ustrial fabric for the entire State.

The total financial investment in industry in the Fifth and Sixth Plans is Projected to be Rs. 766.23 crores and Rs. 1,181.17 crores respectively. If all this investment is to be created, entrepreneurs will have to be identified and induced to locate their units in Gujarat. Local patriotism and a healthy investment climate may be good indications but not good enough unless a pattern of support and assistance is consciously evolved. That is, the proposed projected huge industrial investment and its benefits to the State in terms of income and employment are contingent upon the incentive strategy.

New Scheme of Incentive

4.4 The scheme could be evolved on two tier pattern. *The first would be to catalyse* private investment from within and outside the State. For doing this, the incentives should be such as would match those being provided elsewhere. The second would be to deliberately promote the development of designated backward areas as growth points with a well formulated pattern of support and assistance. Here, the recommendations of the Wanchoo Committee on the development of backward areas would be the guidelines for a scheme of incentives to be provided by the State Government. The proposals hereunder will deal with each category separately.

Catalysing Entrepreneurial Interest from within and outside the State

(*1*) *Preparation of Project Reports*—The State Industries Department should identify a series of projects in the large and medium scale sector based on locally available raw materials or locational advantages or which are complementary to the State's balanced industrial growth and arrange for feasibility studies and project reports to be prepared through reputed consultants. The cost of the project reports should be initially borne by one of the State Corporations and subsequently capitalised in the project cost when implemented by an entrepreneur as the State contribution to the equity of the new venture. An amount of Rs. 25 lakhs in the Fifth and Sixth Plans each is being provided to defray this expenditure.

(*2*) *Plant Location Service.*— Consequent to the preparation of the feasibility studies/ project reports, or at the instance of an entrepreneur who has a project to implement, the plan location service, proposed to be organised, should place itself at the disposal of the entrepreneurs and identify alternative locations with complete information on raw materials, marketing facilities, labour supply, transport advantages, infrastructure, etc. and to help in determining an optimum location from all points of view. An expenditure of Rs. 5 lakhs per Plan is provided under this head.

(*3*) *Technical and Management Consultancy Service.*— It is considered increasingly important to provide these services to small scale industries, particularly those started by techno-entrepreneurs as their break-even point and profitability is considerably determined by their ability to manage their industries properly. Proper guidance at the right time is crucial in bridging the gap between failure and success. A provision of Rs. 10 lakhs in the Fifth and Sixth Plans each is made under this head.

(*4*) *Partnership Promotion Bureau.*—There are a large number of potential entrepreneurs who are in search of financial partners and others who have finances but require partners with technical and other managerial abilities. A Partnership Promotion Bureau which may be set up jointly by the Corporation may locate such entrepreneurs, maintain their list with particulars and put them in each others contacts. After more experience, the Bureau may also be able to help such entrepreneurs to arrive at agreement about their partnership terms.

(*5*) *Appointmet of Liaison Officer.*—The major contact points for identifying and adopting entrepreneurs at the present juncture are Bombay, Calcutta and East Africa. Another point of contact for official relationships is Delhi. Most entrepreneurs find it time consuming, embarrassing and even annoying to get their matters sorted out with the concerned Ministries and Departments in Delhi. Any service that would iron out these problems to a satisfactory solution would be one of the most effective ways of convincing

the entrepreneurs of the State's ability to support their industrial activity. A senio[r]
officer of the rank of Secretary to the State Government should be appointed as a [...]
Officer at Delhi. It is only at this level that the State's interaction can be effective [...]
fruitful. A lower status would ruin the purpose.

An officer at a fairly senior level (not below the rank of Joint Director of Industries [...]
Deputy Secretary to Government) should be appointed at Bombay for establishing conta[ct]
with entrepreneurs. In Calcutta, a local Gujarati resident with adequate business and soci[al]
status with a small supporting staff could adequately serve the purpose. In East Africa, [...]
local non-resident Indian with adequate business and social status with some supporting
staff could be considered.

(6) *Infrastructure*

(a) *Land.*— Fully developed sites or sheds as the case may be should be available on demand with all facilities of power, water supply, roads, commercial, residential and educational facilities, including telecommunications and fire-fighting services, medical care and hospitalisation facilities. The development of industrial areas and estates should be planned keeping in mind the existing facilities available locally and to supplement these adequately so that the development of industries does not become a drag on the civil services and amenities in the area. The Gujarat Industrial Development Corporation has already on hand 60 such industrial areas spread all over the State. A careful selection of the more strategic of these locations and a supporting infrastructure built up for these locations will provide one of the best attractions for industry. Barring a few developed areas around the metropolitan towns of Ahmedabad, Baroda, Surat and Rajkot, the emphasis should be to colonise the selected strategic industrial areas with a scheme of subsidy on the price structure of land and facilities to overcome the resistance of entrepreneurs to set up industries in these growth points. Adequate provision is made in the Fifth and Sixth Plans under Gujarat Industrial Development Corporation's programmes of activities to include the element of State subsidy.

(b) *Power.*— The State is already providing concessions in tariff and exemption from electricity duty for various categories of the industries. It is recommended that these not only be continued but should be stepped up to average the tariff prevalent on Maharashtra Electricity Board pattern outside the developed areas of Ahmedabad, Baroda, Surat and Rajkot within a radious of 15 kms. from the city limits. A table of comparative tariffs is in Schedule 'A'. It is further recommended that the Gujarat Electricity Board should not charge Gujarat Industrial Development Corporation and other entrepreneurs the expenditure on 50 per cent basis for providing sub-station and switching facilities. It is noted that the present pattern of loading Gujarat Industrial Development Corporation and industries with 50 per cent of the expenditure on these overheads sharply increases the premium price of developed plots [...] Gujarat Industrial Development Corporation areas and deters other entrepreneurs. The [Guj]arat Electricity Board should insist on the Gujarat Industrial Development Corporation [...] industries guaranteeing a minimum return on high tension tariff of power supply to [...] areas. The compensation to the Gujarat Electricity Board for the initial capital [expen]diture may be provided by the State Government as an interest-free loan to the Gujarat [Electri]city Board.

[...]city-intensive industries are given a concessional power tariff at 7.25 paise per KW [...]o certain conditions. While the conditions for obtaining this concession can be [...]d reasonable, the rate should be lowered to 6 paise per unit to improve the compe[...] of electrical, chemical and metallurgical units in the State with those located [...]where the low power tariff is undoubtedly a major attraction.

[...]— While water rates in Gujarat cannot be considered excessive for the engineer[ing] [...]ater intensive industries because of the existing concessions available, it may [...] the water-based industries where water is the major consumable material.

For these industries, the rates need to be so structured as to render the unit competitive with others more advantageously located. This is of particular relevance to the Petro-chemical Complex at Nandesari and in the chemicals and pulp and paper industries in South Gujarat.

A paper pulp mill producing 100 tonnes of pulp per day would require 45 million litres of raw water per day. This is a water-intensive industry and as indicated above it deserves special rates. It is proposed that instead of present Re. 0.24 per 10,000 litres, Government may examine releasing fresh water at Re. 0.12 per 10,000 litres for such a unit. In terms of annual subsidy this would amount to approximately Rs. 1.5 lakhs. We would be able to have two units for manufacture of pulp based on eucalyptus trees and bagasse.

(d) *Cost of Land.*— Apart from the metropolitan cities *viz.*, Ahmedabad, Baroda, Surat and Rajkot, in the other developing industrial areas, the premium price of land should be initially pegged at Re. 1.00 per sq. metre for the first five years, thereafter gradually raised to cover full costs in instalments of 20 per cent over the next five years. The cost must be pegged low to enable an early breakthrough so that the profitability of the unit in later years can sustain a higher cost of development. This can be done by the Gujarat Industrial Development Corporation only if the State Government evolves a policy of subsidy on two counts : (i) wherever Government acquires land for Gujarat Industrial Development Corporation, the same should be transferred to Gujarat Industrial Development Corporation at a nominal price, the cost of acquisition being treated as an interest-free loan, with a moratorium of 5 years, the principal repayable over a period of 15 years thereafter. This would enable Gujarat Industrial Development Corporation to purposefully provide attractive land prices to prospective entrepreneurs and (ii) the land under Government ownership all over the State other than those earmarked specifically for Government's committed use or rehabilitation of landless labour, including urban areas, should be transferred by the Revenue Department to Gujarat Industrial Development Corporation on a token price of Re. 1.00 per sq. metre. This would form a substantial subsidy to the Gujarat Industrial Development Corporation without a corresponding revenue loss to the State Government as the compensation of Government revenue does not take into account the value of these lands.

(7) *Exemption from Sales Tax.*—The present concession is limited to few selected urban areas beyond a limit of 16 to 24 kms. The exemption is also only in respect of raw materials, packing material and machinery purchased in the State. This has practically no significance for new entrepreneurs. It is recommended that (i) the limit of 16 to 24 kms. for urban areas be abolished and (ii) the sales tax concession be made applicable to the purchases and sales within and outside the State. If selection is desired, then the criterion should be applied to categories of industries which should be promoted in the State and not uniformly to all industries irrespective of whether they are already in existence or belong to a low priority sector. Such an incentive used with circumspection and wise discretion can be a very effective tool to induce investment in pre-determined categories and as a disincentive to the addition of congestion in non-priority categories.

While the policy of subsidy and incentives could be limited in developed areas to these industries which are considered strategic from the point of view of the State's industrial development, the pattern of assistance, to be more meaningful, should be applied without restriction in the other areas.

4.5 Backward Area Development : Predesignated Growth Points

4.5.1 As stated earlier, it is proposed to earmark four growth points each in the Fifth and Sixth Plans. The pattern of incentives and subsidy to be provided in these growth points should be on the lines of the Wanchoo Committee recommendations. They are briefly restated, so far as the State's responsibility is concerned, as follows :—

(1) *Developing Plots in Blackward Areas.*—(*i*) Where land is acquired by Government and then developed for allotment of plots to the entrepreneurs, land should be evaluated in a reasonable way and care should be taken to see that it is not over valued.

(ii) The developed plots should be given to the entrepreneurs desirous of setting up units
the backward areas on a down-payment of 10 per cent of the value of land and no furth
payment should be asked for from them during the first 5 years. The balance of 90 pe
cent should be recovered over a period of 9 years after the expiry of the 5 year morato
rium, in easy instalments.

(iii) Where an entrepreneur wishes to acquire land himself, he should be assisted by way
of making available a loan to him at a concessional rate of interest. The rate charged for
the land should be reasonable and no profit should normally be made on such sales.

(2) *Provision of Built-up Accommodation.*—(i) Since the cost of construction by the
Government is generally higher, it is recommended that a subsidy to the extent of 50 per
cent of the cost of construction should be given to the entrepreneur who is provided built-up
accommodation and the balance 50 per cent should be collected from him in easy instalments
over a specified period, say 20 years.

(ii) Where the entrepreneur chooses to construct the shed himself, and such a proposition
should be generally encouraged, his cost of construction should be subsidized to the extent
of 25 per cent.

(iii) The rates of subsidy mentioned above will be applicable to the small scale units only.
In respect of medium-sized industries, subsidization should be on a lower scale.

(3) *Machinery and Equipments.*—The rate of interest to be charged on machinery and
equipment supplied on hire-purchase basis to units set up in backward areas should be
3 per cent, the same as on loans under the State Aid to Industries Act and the minimum initial
earnest money required to be deposited should also be reduced to 10 per cent in stead of the
existing 20 per cent, and that no surcharge should be levied by the National Small Industries
Corporation. This concessional rate of interest as also the reduction in the initial amount
required to be deposited, etc , would also apply to all the State Small Industries Corporations.
Losses accruing to the NSIC and the SSIC resulting from the supply of machinery and
equipment at lower rates of interest, etc. should be made good by the Central or State
Government.

(4) *Fiscal Incentives.*—(a) Grant of higher development rebate to industries located in
backward areas.

(b) Grant of exemption from income-tax, including corporate tax, for 5 years after
providing for the development rebate.

(c) Exemption from the payment of import duties on plant and machinery, components,
etc., imported by units set up in backward areas.

(d) Exemption from excise duties for a period of 5 years.

(e) Exemption from sales tax, both on raw materials and finished products, to units set
up in specified backward areas for a period of 5 years, from the date of their going into
production.

(f) Transport Subsidy: There is a case for giving transport subsidy for reasons of special
remoteness of certain areas, for taking out the finished products for a period of 5 years. Up
to 650 kms (400 miles) the distance should be considered as normal and beyond that the
transportation cost for finished products should be subsidized for such backward areas as
may be selected.

4.5.2 The incentives recommended by the Wanchoo Committee, however, will be supple-
mented by the State Government with two additional major schemes as follows :—

(1) *Cash Subsidy.*— The 10 per cent cash subsidy in the Panchmahals district offered
under the Central scheme is limited to the projects with fixed investment of Rs. 50 lakhs or
less. Since a number of medium and large scale units will be set up during the Fifth and
Sixth Plans, the State Government will expand cash subsidy scheme by offering

	Activity	Expenditure 1974-75 to 1978-79 (Rs. in lakhs.)	Outlay 1979-80 to 1983-84 (Rs. in lakhs)
IV	Developing handlooms and handi-crafts with special emphasis on exports.		
	(i) Training-*cum*-production centres	5.20	10.00
V	Export potential survey cell (continuous) ..	4.95	7.65
VI	Technical cell (to advice entrepreneurs in techniques, etc.) ..	1.25	3.00
VII	Development cell (to create export consciousness)	4.95	7.65
VIII	Trade delegations (abroad) (Sending abroad delegations of 5 members each twice a year and inviting 1/2 foreign buyers every year).	8.00	8 00
IX	Library, periodicals etc.	0.96	1.49
	Total ..	79.71	133.09
		Say, 80.00	Say, 133.00

4.6.2 While arriving at the above figures, we have to take into account the grants that may be given by the Marketing Development Fund of the Government of India to the extent of 50 to 75 per cent. If our activities are, therefore, assisted to 50 per cent on an average, with provision of Rs. 40 lakhs in the State fund for the Fifth Plan and Rs. 66.5 lakhs in the Sixth Plan, we would be able to meet with the above indicated additional activities to be undertaken. However, there may be unforeseen additional developments on the export front that may have to be undertaken. In view of this, the above provision may be raised to Rs. 50 lakhs for the Fifth Plan and Rs. 1 crore for the Sixth Plan.

Incentive Fund

4.7 To finance the above stated schemes of assistance, exclusive of export incentives, a provision of Rs. 100 00 crores per Plan is recommended. Considering the extent to which incentives and subsidies are necessary to ensure catalysing projected investment in the Fifth and Sixth Plans, the assistance of Rs. 20 crores per year cannot be considered unduly excessive. It is, at the same time, an integral part of the industrial investment strategy. In fact, this should be regarded not as a subsidy but as an investment by the State Government in the industrial development of the State which will yield an attractive return. Against the total projected investment in the two Plans of Rs. 1,947.4 crores, the assistance of Rs. 200 crores works out to 10 per cent of investment. Assuming value added by production to capital investment as a ratio of 2 : 1, the total production in the State from the two Plan investments will be Rs. 3,895 The direct tax revenue to the State from this, at a *minimum rate of 6 per cent on the* added, will be Rs. 2,322 crores even excluding the multiplier effect of the above d in terms of additional employment, income, consumption and investment. The present of the tax revenue to State, discounting at 6 per cent, will be Rs. 936.2 crores. The present of the incentive fund of Rs. 200 crores to be spent over a period of 10 years, at 6 per cent, will be Rs. 156.01 crores. Thus an investment by the State in the ince as proposed will earn a return of 22 per cent and an absolute yield six times the incentive. The detailed calculations are given in tables, 1, 2 and 3.

TABLE 1

Present Value of Incentive Schedule at 6 per cent Discount

(Rs. in crores)

Year	Incentive (Absolute)	6 per cent discount	Present value
First	20.00	1	20.00
Second	20.00	0.94339	18.87
Third	20.00	0.88999	17.80
Fourth	20.00	0.83961	16.80
Fifth	20.00	0.79209	15.80
Sixth	20.00	0.74725	14.95
Seventh	20.00	0.70496	14.10
Eighth	20.00	0.66505	13.30
Ninth	20.00	0.62741	12.55
Tenth	20.00	0.59189	11.84
	200.00		156.01
		Say,	156.00

TABLE 2

Present Value of Tax Returns to State Discounted at 6 per cent

(Rs. in crores)

Year	Tax base created (Absolute)	6 per cent D. C. F.	Present value
6th	$150 \times 2 \times \frac{6}{100} = 18$	0.74725	13.5
7th	$300 \times 2 \times \frac{6}{100} = 36$	0.70496	25.4
8th ..	$450 \times 2 \times \frac{6}{100} = 54$	0.66505	35.9
9th	$600 \times 2 \times \frac{6}{100} = 72$	0.62741	45.2
10th	$750 \times 2 \times \frac{6}{100} = 90$	0.59189	53.3
11th	$990 \times 2 \times \frac{6}{100} = 118.8$	0.55839	66.3
12th	$1230 \times 2 \times \frac{6}{100} = 147.6$	0.52678	77.6
13th	$1470 \times 2 \times \frac{6}{100} = 176.4$	0.49696	87.6
14th	$1710 \times 2 \times \frac{6}{100} = 205.2$	0.46883	96.1
15th } 20th Year } ..	$1950 \times 2 \times \frac{6}{100} = 234/\text{year}$	$4.2 \times 0.442 = 1.86$	435.3
	Rs. 2,322		Rs. 936.2

TABLE 3

Present Value of Tax Return to the State Discounted at 22 Per cent

(Rs. in crores)

Year	Tax base created (Absolute)	22 per cent DCB	Present value
6th	18	0.37	6.7
7th	36	0.3	10.8
8th	54	0.25	13.5
9th	72	0.2	14.5
10th	90	0.167	15.0
11th	118.8	0.137	16.3
12th	147.6	0.112	16.5
13th	176.4	0.092	16.2
14th	205.2	0.075	15.4
15th-20th	234/year	2.86 × 0.062	42.5
			166.4

SCHEDULE "A"

Comparative Statement showing the average rates of energy in paise per unit under the High Tension Tariffs of the Maharashtra Electricity Board and the Gujarat Electricity Board

Sr. No.	Particulars	Average rate in paise per unit: Maharashtra Electricity Board		Average rate in paise per unit: Gujarat Electricity Board
		Hydro	Thermal	
1	250 KW 40 per cent L. F. 294 kva 73,000 kWh/month.	10.59	11.78	13.73
2	250 KW 70 per cent L. F. 294 kva 97,750 kWh/month.	9.49	10.57	12.40
3	250 KW 80 per cent L. F. 294 kva 1,46,000 kWh/month.	9.30	9.51	10.67
4	1000 KW 50 per cent L. F. 1176 kva 3,65,000 kWh/month.	9.63	10.52	12.45
5	1000 KW 60 per cent L. F. 1176 kva 4,38,000 kWh/month.	9.02	9.79	11.39
6	5000 KW 60 per cent L. F. 5882 kva 21,90,000 kWh/month.	8.41	8.70	10.22

Statement showing the comparative tariffs for the supply to the low tension industrial consumers between Gujarat Electricity Board and Maharashtra Electricity Board

Gujarat Electricity Board			Maharashtra Electricity Board
Rate LTP-1			Rate LTP-G (As amended from 1st October 1969).
Applicable for motive power service (including water works) for purpose other than agricultural.	For the first 100 (hundred) units consumed/month/BHP of connected load or contracted load, whichever is higher.	17.5 Ps. per unit.	Applicable to General motive Power Service (including non-agricultural pumping loads) requiring not more than 50 KW of demand.
	For the next 150 (one hundred and fifty) units consumed/month/BHP of connected load or contracted load, whichever is higher.	16 Ps. per unit.	kWh/month — P/kWh All consumption — 18
	For all additional units consumed during the month.	13 Ps. per unit.	

Load	Month consumption	Average rates in paise per unit: In Gujarat	Average rates in paise per unit: In Maharashtra
5 H. P.	375 units	17.5	18
10 H. P.	1,000 units	17.5	18
30 H. P.	4,000 units	17.12	18
40 H. P.	7,000 units	16.85	18
50 H. P.	10,000 units	16.75	18

CHAPTER V

INDUSTRIAL SCHEMES AND STATE OUTLAY

5.1 *By the end of the Fourth Five Year Plan, the State economy will be on the threshold of a new phase in its industrial development.* The Petro-chemical Complex, the Fertilizer Project of IFFCOs and the caprolactum facilities of Gujarat State Fertilizers Company will be entering the production stage. These large scale units are expected to generate major thrusts of investment, output and income. From this new base, several other large, medium and numerous small scale chemical, plastics and engineering units will come up all over the State. The 1974-84 decade thus will be marked by significant structural changes and diversification in the existing pattern of State industrial production, accompanied by a rapid growth rate both in production and employment. It will be the function of the State to initiate, support, sustain, control or accelerate the changes in this new phase to obtain optimum benefits therefrom.

Strategy

5.2 The long term industrial development strategy proposed is formulated around the following major guidelines :—

(*a*) In view of the national and State problem of unemployment, *the industrial development must assign a high priority to maximising employment opportunities consistent with* efficient use and distribution of production resources. This will require emphasis on large and medium scale industries which, apart from generating production for employment themselves, will widen the base for employment-intensive medium and small-scale industries. With high employment co-efficient per capita investment, the village and cottage industries will have to be intensively promoted in co-ordination with the development in the organised sector.

(*b*) The process of geographic decentralisation and dispersal of economic development gains within the State shall have to be accelerated by careful location of industries in less urbanised and industrially less developed districts. A package of incentives will have to be provided by the State for attracting entrepreneurs to these regions. With their rural base, the development of the village and cottage industries will automatically receive impetus and bring us nearer to the goal of balanced regional development.

(*c*) The development of petro-chemicals, chemicals and mineral-based industries is the outcome of the newly found natural resources in the State. These valuable indigenous resources must be optimally utilised to maximise benefits to the State and national economy. Industrial research and efforts to improve technical competence will have to receive a high priority.

(*d*) The changed structure of industries will open up a different and wide array of industrial opportunities. The policy thus must aim at expanding and broadening the base for supplying entrepreneurs to convert these *manufacturing opportunities into industrial units. Increased* emphasis will have to be placed on the development of techno-entrepreneurs consistent with the changing technology and the growing supply of engineers and technicians in the State.

5.3 Based on the above guidelines the strategy and the specific programmes to implement it will be as follows :—

Infrastructure

5.3.1.1 The major task will be to expand industrial infrastructure to meet the demand of the large and medium scale industries and the ancillary small scale units for land, roads, water

drainage, disposal of effluent, etc. The infrastructure will also have to be reshaped to deal with the complete requirements of the petro-chemical and other technologically advanced industries. The State will therefore be required to supplement considerably the resources of Gujarat Industrial Development Corporation, which will have to bear the major brunt of this activity.

5.3.1.2 The Corporation will have established over 60 various industrial estates/areas/ townships all around the State by the end of the Fourth Plan. Apart from providing industrial infrastructure, these locations of industrial estates/ areas will be planned growth points of industries which will, apart from their promotional effects in attracting industries with ready-made facilities, also supply the State with regulatory and directional tools for geographic dispersal of industries. During the Fifth Plan, the resources required by way of loan by GIDC are estimated at Rs. 1,000 lakhs and at Rs. 1,250 lakhs in the Sixth Plan. In addition, another Rs. 15 lakhs and Rs. 20 lakhs in the Fifth and the Sixth Plans respectively will be required for constructing approach roads to the new industrial centres in the State.

Finance

5.3.2.1 Availability of adequate finance will be a crucial factor in the actual establishment of the expected large, medium and small scale units. The State has already established the Gujarat State Financial Corporation and the Gujarat Industrial Investment Corporation for providing liberal finance. The State will have to supplement the resources of GSFC to the extent of Rs. 50 lakhs and of GIIC to the extent of Rs. 1,000 lakhs during the Fifth Plan. During the Sixth Plan, the amount required will be of the order of Rs.100 lakhs and Rs. 1,000 lakhs for these two Corporations respectively. These two financial institutions will finance medium and small scale units. These Corporations are also expected to serve as tools for achieving decentralisation and diffusion of economic activity to various regions of the State, as also encourage and promote new entrepreneurs. Today even national financial institutions hesitate to assist new entrepreneurs unless the State financial and investment corporations give a lead so as to indicate the State's involvement in a given project. As such these institutions will play a crucial part in promoting new entrepreneurs by advancing loans and participating in their equity formation. An additional provision for underwriting of shares by the State financial institutions has also been made to the tune of Rs. 700 lakhs in the Fifth Plan and Rs. 750 lakhs in the Sixth Plan.

5.3.2.2 Though the structural pattern of industries will be substantially changed, the textile industry will continue to remain in prominence. To look after this sector and its problems, the Gujarat State Textile Corporation has already been formed. Towards financing the operations of this Corporation in its handling of deteriorating textile units, the State will have to put aside Rs. 300 lakhs in the Fifth Plan and Rs. 400 lakhs in the Sixth Plan.

5.3.2.3. The Gujarat Export Corporation of the State which has already been established is expected to intensify its activities for export promotion during the Fifth Plan and the Sixth Plan. Its finances will require to be supplemented by the State by Rs. 50 lakhs in the Fifth Plan and Rs. 100 lakhs in the Sixth Plan.

5.3.2.4. A total amount of Rs. 33.00 crores will be the State's provision of finance for the various Corporations in the Fifth Plan and Rs. 38.00 crores in the Sixth Plan.

Industrial Research

5.3.3 For optimum use of the newly found resources of the State and to convert them into a variety of industrial opportunities, industrial research activities will have to be appropriately intensified, and for which the State will have to play an important and leading role. A total provision of Rs. 302.50 lakhs has been made in the Fifth Plan for industrial research increased to Rs. 325 lakhs in the Sixth Plan. Of this, Rs. 232.50 and Rs. 235.00 lakhs will be spent on industrial research grants to various research institutions and laboratories already established or to be established in the Fifth Plan and Sixth Plan respectively. Among the specific programmes, a Regional Research Laboratory on the lines of C. S. I. R., Hyderabad will be established with a State grant of Rs. 100 lakhs. A polymer research institute with a grant of Rs.1.00 crore will be

established to develop new products from and make efficient use of the basic resins produced in the Olefins Project of the Petro-chemicals Complex. A Glass and Ceramic Institute with a grant of Rs. 60 lakhs will be established for undertaking research for the manufacture of glass and ceramics in which the State has excellent scope for expansion. Similarly, to accelerate the expansion of the sugar industry in the State to meet the growing demand, a Sugar Research Institute with a grant of Rs. 1.00 crore is also proposed. This will enable the State to improve utilisation of by-products such as molasses and baggasse. Among the other programmes will be a Cement Research Institute, Electronics and Machine Tools Development Institute and a Man-made Fibre Research Institute—all towards meeting the needs of the new industrial structure.

Village and Small Scale Industries

5.3.4 This is the sector through which the industrial employment strategy will be implemented. This is the sector which will open up industrial opportunities for numerous local entrepreneurs as the large and medium industries get into production. This is the sector which will, apart from decentralisation of opportunities, lead to geographic dispersal of industrial gains since the small scale and the village industries would be feasible even in rural and less developed areas. During the Fifth Plan, the proposed State outlay has been at Rs. 570.60 lakhs and at Rs. 749.20 lakhs during the Sixth Plan.

Small Scale Industries, Organised Sector

5.3.5.1 The development of small-scale industries will be essentialy dependent upon the speedy execution of infrastructural schemes for providing developed land and ready-made sheds on liberal long term repayment conditions to the entrepreneurs. The entrepreneurs will be financed through the schemes of Gujarat State Financial Corporation and Gujarat Industrial Investment Corporation The Gujarat Small Industries Corporation will assist small units in the puchase of machinery and raw materials. The Industries Commissioner grants loans up to Rs. 3,000 and in exceptional cases up to Rs. 5,000 to qualified, trained or experienced artisans or technicians to carry out any of the scheduled jobs under the provisions of Gujarat State Aid to the Professionals and Artisans Rules, 1971. Under the package schemes, the Directorate of Industries also provides financial assistance to the extent of Rs. 10,000 at 3 per cent interest to unemployed technicians. The Gujarat State Financial Corporation also grants loans to small as well as medium scale industries from its funds. State Government is also subsidising the difference between normal lending rate of the Corporation and subsidised rate of interest. This scheme will be continued during the Fifth and Sixth Plans.

5.3.5.2 To encourage small scale and cottage industries to increase their production by use of motive power, subsidy is granted on consumption of electricity. More and more small scale units will be taking advantage of this for which a provision has ben made in the State finance.

5.3 5.3 The Quality Marking Scheme has been introduced to assist small industries to maintain product quality with 2 centres at Baroda and Rajkot by the end of the Fourth Plan. This scheme will be expanded in several other industrial centres. Similarly, testing facilities are ba ly required for the small scale entrepreneurs increasingly manufacturing sophisticated engineering and other products. Since such testing facilities require substantial capital for the small entrepreneur, there is a scheme in the Fourth Plan for financial assistance to small scale industries by way of subsidy towards testing charges paid for products tested in approved testing houses. The scheme is proposed to be continued during the Fifth and Sixth Plans and will cover a larger number of units. Similarly, factory owners desiring to own testing equipments are proposed to be granted a subsidy or grant-in-aid for part of the expenditure incurred on the purchase of such equipment.

5.3.5.4 With changing industrial structure and new opportu to assist established entrepreneurs and encourage new entrepreneu Industrial Information Centres already established in a number

informat[illegible]

further into rural and newly developing areas. A provision has already been made for supplementary efforts including organisation of exhibitions and seminars by the department as well as private organisations.

5.3.5.5 Further assistance to small scale units will be required in the form of common facilities centres to enable them to use machines and processses which they cannot otherwise afford. Five such centres would have been established preferably in the industrial estates by the end of the Fourth Plan. Their numbers will be expended to 25 by the end of the Sixth Plan to keep up with the increased number of industrial growth points. Assistance in the form of loan will also be given for setting up such centres to combine and private units in industrial estates/areas.

Khadi and Village Industries

5.3.6 Rs. 47.00 lakhs and Rs. 94.00 lakhs, respectively are provided for in the Fifth and Sixth Plans to assist production and sales expansion of khadi and village industries.

Handlooms

5.3.7 The planned schemes will aim at improving the competitiveness of the handloom industry together with measures to increase popularity and demand for the cloth. Rs. 40.00 lakhs in the Fifth Plan and Rs.50.50 lakhs in the Sixth Plan will be spent by the State towards these schemes. Weavers will be assisted by way of loans for purchase of shares of weavers' societies. Training of handloom weavers, rebate on sale of handloom cloth, supply of improved looms and accessories, setting in of dye houses and new sales depots, and financial assistance to C. F. As. for advances of loans from their own funds, and guarantees for losses and loans at subsidised rate of interest will be the other schemes to be implemented in an expanded way.

Powerlooms

5.3.8 Efforts will be made to help existing weavers to convert their handlooms into powerlooms. A provision of Rs. 50 lakhs in the Fifth Plan and Rs. 75 lakhs in the Sixth Plan is made for this purpose.

Handicrafts

5.3.9 Similarly, a number of schemes in operation already to help the artisans in different handicrafts industries to organise themselves in co-operatives, improve the competitiveness of the handicraft articles, promote their sales within and outside the country will be further expanded and coordinated during the Fifth and Sixth Plans. Rs.30 lakhs in the Fifth and Rs.40 lakhs in the Sixth Plan will be spent by the State on these schemes. The number of sales depots, show-cases and design centres will be increased. Government share capital contribution will be granted to individuals and societies and assistance will be provided for purchase of tools and equipments.

Coir

5.3.10 During the Third Plan, one training school in coir industry was started. A provision of Rs. 0.50 lakh is made in the Fourth Plan. During the Fifth Plan and Sixth Plan, Rs. 0.60 lakh and Rs. 0.70 lakh respectively will be provided for this purpose.

Cottage Industries

5.3.11.1 A variety of schemes for training and financial assistance to individuals and societies at concessional rate, share capital contribution to societies, rural workshops, managerial subsidy to societies, work sheds and godowns, assistance to societies for sale of cottage industry products, share capital loans for prospective members of the society, training of administrative and supervisory staff, and strengthening and revitalising of dormant societies have already been implemented. The Fifth and the Sixth Plans aim to further solidify and strengthen these various schemes by providing Rs. 145.00 lakhs in the Fifth Plan and Rs. 225.70 lakhs in the Sixth Plan.

5.3.11.2 Among the new schemes for cottage industries, diamond cutting societies will be established with State contribution of Rs. 45.00 lakhs in each Plan for block capital and working capital. Co-operative Ayurvedic Society will also be set up for which a provision is made for Rs. 35.00 lakhs in the Fifth Plan and Rs. 10.00 lakhs in the Sixth Plan.

5.3.11.3 The pioneering scooter factory organised by the Gujarat Small Industries Corporation will be also in operation by the end of the Fourth Plan. It is proposed to set up a co-operative scooter factory for which Rs. 60.00 lakhs will be the State's contribution for block and working capital in the Fifth Plan and Rs. 30.00 lakhs in the Sixth Plan.

Centrally Sponsored Scheme

5 3.12 The rural industries projects initiated in Panchmahals and Kutch districts in the Third Plan have been continued during the Fourth Plan This centrally sponsored scheme is proposed to be carried on further in the Fifth and Sixth Plans. The expenditure will be Rs. 25.80 lakhs in the Fifth Plan and Rs. 51.00 lakhs in the Sixth Plan.

Incentive Fund

5.3.13.1 Special efforts will have to be made during this new industrial phase of the State to ensure that entrepreneurs find the State a desirable and attractive location to set up large and medium scale industries. The industrial development of the State so far has been mainly through small scale industries with an exception of the textile industries. By the end of the Third Plan and during the Fourth Plan, gradually, larger units are being located. A concerted effort will be required through a package of incentives to improve the competitiveness of the State and compensate for cost increasing factors for the industries if they are to be located in the State. An incentive fund of Rs. 100.00 crores each in the Fifth and Sixth Plan will be utilised for the State package of incentives. It will be utilised for the following major purposes :—

1. Cash subsidy for backward areas

2. Subsidy for power

3. Subsidy for water

3. Subsidy for land

5. Subsidy for feasibility studies

6. Interest-free sales tax loan.

5.3.13.2 The incentive fund is provided with an ultimate aim of expanding the industrial base of the State. The increased investment output and employment will have multiple effect on the State economy and will broaden its tax base which will help more than recover the investment made in the incentive schemes.

Export Incentives

5.3.14 The State will have to play a significant role in promoting exports. A detailed scheme of incentives has been suggested with a provision of Rs. 50 lakhs for the Fifth Plan and Rs. 1.00 crore for the Sixth Plan, with an equal amount coming from the M. D. F.

Total State Outlay

5.3.15 The total State outlay for the Fifth Plan will be Rs. 14,460.60 lakhs and Rs. 15,324.20 lakhs for the Sixth Plan. Its summary components are given in Statement I.

STATEMENT I

State Outlays during the Fifth and Sixth Plans

(Rs. in lakhs)

Major Components	Fifth Plan	Percentage to total	Sixth Plan	Percentage to total
State Corporations	3,500.00	24.00	4,100.00	26.00
Industrial Research	345.00	2.00	415.00	3.00
Village and Small Scale Industries ..	570.60*	4.00	749.20*	5.00
Incentive Fund	10,000.00	69.00	10,000.00	65.00
Others (including approach roads and adoption of metric system)	45.00	1.00	60.00	1.00
Total ..	14,460.60@	100.00	15,324.20@	100.00

* Excludes centrally sponsored scheme of Rs. 25.80 lakhs in Fifth Plan and Rs. 51.00 lakhs in Sixth Plan.

@Excludes centrally sponsored scheme of Rs. 25.80 lakhs in Fifth Plan and Rs. 51.00 lakhs in Sixth Plan and Rs. 50.00 lakhs and Rs. 1.00 crore from M. D. F. for export incentives.

STATEMENT II

Outlays for Fourth, Fifth and Sixth Plans

(Rs. in lakhs)

Category	Outlays proposed for		
	Fourth Plan	Fifth Plan	Sixth Plan
1. Large and Medium Industries ..	1,102.00	3,890.00@	4,575.00@
2. Village and Small Industries—			
(a) Organised Small Scale Industries	123.50	118.00	179.00
(b) Village and Cottage Industries (including industrial co-operatives)	174.50	478.40*	621.20*
3. Incentive Fund ..	..	10,000.00	10,000.00
4. Others-M. D. F. for export incentives	.	50.00	100 00
Total ..	1,400.00	14,536.40	15,475 20

@Includes Industrial Research, Approach Roads and Adoption of Metric Sytem in weights and Measures.

*Includes centrally sponsored schemes of Rs. 25 80 lakhs in Fifth Plan and Rs 51.00 lakhs in Sixth Plan.

STATEMENT III—*contd.*

	Required Investment (Rs. in lakhs) Fifth Plan	Sixth Plan
	15.00	20.00
Infrastructure—		
(...) Approach Roads	30.00	40.00
	45.00	60.00
Others—		
(a) Adoption of Metric System in Weights and Measures	..	..
Village and Small Scale Industries—		
A. Small Scale Industries (Orgnised Sector)		
1 (a) Financial Assistance to Small Scale Industries	25.00	50.00
(b) Subsidy to Gujarat State Financial Corporation	3.00	4.00
2. Subsidy on power supply	37.50	50.00
3. Quality Marking of Products of Small Scale Industries	7.50	10.00
4. Testing of products of Small Scale Industries	.. 7.50	10.00
Financial Assistance to Small Scale Facilities	3.75	5.00
(a) Financial Assistance Centres.	15.00	20.00
5. Gujarat Small Industries Corporation—Loan for Hire Purchase etc.	3.75	5.00
6. Financial assistance to common facility centres	15.00	25.00
7. Gujarat Small Industries Corporation Ltd.	N. A.	N. A.
	118.00	179.00
Fully Centrally Sponsored Scheme		
Collection of statistics relating to village and small scale industries in un-organised sector	47.00	94.00
B. Village and Cottage Industries		
1. Khadi and Village Industries	1.00	1.50
2. Handloom	0.55	0.55
(a) Share capital loans to Weavers	30.00	40.00
(b) Training of Weavers	..	..
(c) Sale of Handloom Cloth	0.65	0.65
(d) Sale Promotion Scheme	..	..
(i) Societies to be assisted	..	..
(ii) Special weeks to be celebrated	..	..

STATEMENT III—*contd.*

	Required Investment (Rs. in lakhs) Fifth Plan	Sixth Plan
(*e*) Financial assistance to C. F. As. for advance of loan from their own funds and guarantees for losses on loans at subsidised rate of interest.	2.50	2.50
(*f*) Supply of improved looms and accessories ..	5.00	5.00
(*g*) Dye-houses	0.30	0.30
(*h*) Spinning Mills	..	..
	40.00	50.50
3. Powerlooms—		
Powerlooms.	50.00	75.00
4. Handicrafts—		
(*a*) (*i*) Emporia	15.00	23.00
(*ii*) Sales Depots	5.20	5.65
(*b*) Show Cases	0.30	0.35
(*c*) Competition of Handicrafts	1.00	1.00
(*d*) Export Promotions	0.50	0.75
(*e*) (*i*) New Societies to be organised	..	..
(*ii*) Societies to be assisted	1.00	1.00
(*f*) Individuals to be assisted	1.00	1.15
(*g*) State Design Centre	5.00	6.00
(*h*) Rural Crafts Museum to be assisted ..	1.00	1.10
	30.00	40.00
5. Coir—		
Training school of coir	0.60	0.70
6. Cottage Industries—		
(A) Existing Schemes		
(*a*) Trainees to be trained in district training and service institutes.	5.63	7.00
(*i*) No. of institutes-3 Nos.		
(*ii*) Persons to be trained-450 Nos. ..		
(*b*) Diamond Jubilee Cottage Industries Institute (Training of Personnel.)	20.00	30.00
(*c*) Rural Workshops	15.12	20.16
(*d*) (*i*) Individuals to be assisted	47.50	89.09
(*ii*) C. F. As. to be assisted	..	..

STATEMENT III—*contd.*

	Required Investment (Rs. in lakhs) Fifth Plan	Sixth Plan
(*e*) Individuals and societies to be assisted at concessional rate of interest by C. F. As. from their own funds and guarantee for losses.	..	..
(*i*) Individuals	5.00	5.25
(*ii*) Societies	..	..
(*f*) Societies to be granted share capital contribution		
(*i*) Societies	10.00	15.25
(*ii*) Urban Banks	12.50	20.00
(*iii*) Industrial Co-operative Banks	10.00	10.00
(*g*) Societies to be granted managerial subsidy	2.25	2.50
(*h*) Secretaries' cadre scheme	1.00	1.00
(*i*) Worksheds and godowns	4.00	4.75
(*j*) Branches of Industrial Co-operative Banks	4.00	4.00
(*k*) Societies to be given assistance for sale of cottage industries' products.	2.00	2.00
(*l*) Administrative and supervisory staff	2.00	10.00
(*m*) Societies to be revitalised	3.00	3.00
(*n*) Share capital loan for prospective members of societies.	1.00	1.00
	145.00	225.00
(B) New Schemes—		
(*a*) Diamond cutting societies		
(*i*) Block capital (Building, Machinery)	20.00	20.00
(*ii*) Working capital	25.00	25.00
(*b*) Co-operative Ayurvedic Societies		
(*i*) Block capital (Land, Building, Machinery)	25.00	..
(*ii*) Working capital	10.00	10.00
(*c*) Co-operative Scooter factory		
(*i*) Block capital	40.00	10.0
(*ii*) Working capital	20.00	20.0
	140.00	85.

STATEMENT III—*concld.*

	Required Investment (Rs. in lakhs) Fifth Plan	Sixth Plan
III. Incentive Fund		
(*a*) Cash subsidy for less developed areas ..	2,000.00	2,000.00
(*b*) Power rate incentives	2,000.00	2,000,00
(*c*) Land price concessions ..	1,000.00	1,000.00
(*d*) Water rate incentives	500 00	500.00
(*e*) Feasibility studies	25.00	25.00
(*f*) Sales tax capitalised loan	3,000.00	3,000.00
(*g*) Other incentives	1,475.00	1,475.00
	10,000.00	10,000.00

SUMMARY

	Fifth Plan	Sixth Plan
I. Total of Large and Medium Industries	3,890.00*	4,575.00*
II. Total of Village and Small Scale Industries (State Plan)	570.60	749.20
III. Total of Incentive Funds	10,000.00	10,000.00
Centrally Sponsored Scheme		
(*a*) Rural Industries Projects under Village and Small Scale Industries.	25.80	51.00
Others (M. D. F. for export incentives) ..	50.00	100.00
Total (including centrally sponsored scheme)	14,536.40	15,475.20

* Including Industrial Research, Approach Roads and Adoption of Metric System in Weights and Measures

APPENDIX A

OVERALL PICTURE OF INDUSTRIAL DEVELOPMENT DURING FIFTH AND SIXTH PLANS

	During the Fifth Plan			During the Sixth Plan		
	Additional value of production (Rs. in crores)	Additional investment (Rs. in crores)	Additional employment (No.)	Additional value of production (Rs. in crores)	Additional investment (Rs. in crores)	Additional employment (No.)
(A) Chemicals and Non-Engineerings Industries—						
(i) Large Scale ..	406.40	482.20	67,745	506.90	432.45	58,025
(ii) Small Scale ..	142.35	39.10	49,700	186.60	51.40	64,000
(B) Petro-chemicals Refinery ..	113.00	75.20	2,710	183.40	156.70	4,925
(C) Engineering—						
(i) Large Scale ..	354.50	196.30	45,000	773.00	400.62	1,01,225
(ii) Small Scale ..	207.62	30.53	73,890	200.64	46.49	90,085
(D) Textile	240.00	120.00	..	400.00	200.00	31,800
(E) Agro Industries ..	25.50	20.40	5,830	21.75	17.40	2,870
(F) Cottage Industries .	5.00	4.78	26,300	6.00	6.81	44,900
Grand Total .	1,494.37	968.51	2,71,175	2,278.29	1,311.87	3,97,830

APPENDIX B-1

APPENDIX

CHEMICAL AND NON-ENGINEERING

Sr. No.	Item	Capacity approved (Licensed) (1970-71)		Capacity installed (1970-71)		Capacity expected to materialise by 1973-74 (in Gujarat)	
		All India (Tonnes)	Gujarat (Tonnes)	All India (Tonnes)	Gujarat (Tonnes)	Quantity (Tonnes)	Value (Rs. in crores)
1	2	3	4	5	6	7	8
1	Fertilizer ..	..					
	(a) Nitrogenous	..2 Million	7,50,000	1.13 Million	1,75,000	2,50,000	9
	(b) Phosphate	.. 5,00,000	3,40,000	2,27,000	70,000	70,000	2
2	Salt	..7 Million	3 Million	7 Million	3.5 Million	3.5 Million	15
3	Soda Ash ..	.. 9,22,000	6,70,000	4,70,000	4,10,000	5,60,000	31
4	Caustic Soda ..	.. 6,12,000	76,000	3,67,000	38,000	75,000	7.5
5	Fluorine Chemicals	.. 30,000	28,000	12,000	10,800	20,000	11
6	Polyphosphate ..	.. 20,000	..	12,000	..	..	..
7	Industrial Explosives	.. 15,000	..	25,000	..	..	..
8	Sugar	..4.7 Million	3,25,000	..	1,50,000	2,00,000	40
9	Alcohol ..	.. 3,50,000	13,000	1,75,000	6,300	13,000	0.7
10	Acetic Acid ..	.. 17,300	..	17,300	..	..	..
11	Cement ..	..20 Million	3 Million	16.95 Million	1.6 Million	2 Million	47
12	Ceramic and Refractories	..1 Million	30,000	1 Million	30,000	30,000	3
13	Glass	.. 3,00,000	53,000	1,53,000	40,000	53,000	3.7
14	Vegetable Oil ..	.. ..	4,00,000	..	3,00,000	4,00,000	160
15	Vanaspati ..	.. 6,81,000	1,12,500	6,25,000	82,500	1,12,500	..
16	Paper and Pulp. ..	.. 7,80,000	76,500	..	60,000	75,000	14
17	Cigar/Cigarettes ..	.. 62,000 Million Pcs.	9,000 Million Pcs.	57,000 Million Pcs.	..	45,000 Million Pcs.	20
18	Auto Tyres and Tubes	.. 3.75 Million Nos.	3,00,000 Nos.	N. A.	..	3,00,000 Nos.	12
19	Heavy Water ..	.. ..	..	..	..	..	..
20	Dye-Stuff and Pharmaceuticals	..	..	..	..	..	..

B—1

INDUSTRIES, (LARGE SCALE SECTOR)

Proposed targets for 1978-79 for Gujarat					Perspective targets for 1983-84 for Gujarat				
Total (Tonnes)	Additional (Tonnes)	Value (Rs. in crores)	Additional invest-ment (Rs. in crores)	Additional direct employ-ment (No.)	Total (Tonnes)	Additional (Tonnes)	Value (Rs. in crores)	Addi-tional invest-ment (Rs. in Crores)	Additional direct employ-ment (No.)
9	10	11	12	13	14	15	16	17	18
7,50,000	5,00,000	18	250	3,000	9,00,000	1,50,000	5.5	75	1,000
3,40,000	2,70,000	8			4,25,000	85,000	2 5		
6 Million	2.5 Million	10 8	1.5	50,000	7.5 Million	1 5 Million	0 5	0 8	30,000
7,50,000	90,000	10	10	1,000	10,00,000	2,50,000	14	14	1,400
1,00,000	25,000	2.5	5.5	125	2,50 000	1,50,000	15	30	300
25,000	5,000	3	0 6	70	80,000	55,000	30	7	700
10,000	10,000	6	3	250	15,000	5,000	3	1 5	125
5,000	5,000	2	2	150	10,000	5,000	2	2	150
3,50,000	1,50,000	30	15	1,500	5,00,000	1,50,000	30	15	1,500
20,000	7,000	0 3	1	100	40,000	20,000	0 9	2 5	350
5,000	5,000	1	0.5	100	10,000	5,000	1	0 5	100
3 Million	1 Million	23	40	1,000	4.5 Million	1 5 Million	35	60	1,500
60,000	30,000	3	2	1,000	1,20,000	60,000	6	4	2,000
1,00,000	47,000	3 3	8	2,500	1,50,000	50,000	3 5	9	3,000
5,00,000	1,00,000	40	1	3,000	7,50,000	2,50,000	100	2.5	8,000
1,50,000	37,500	30	2.0	250	2,00,000	50,000	40	2 7	300
1,00,000	25,000	4.5	12.5	600	3,00,000	2,00,000	76	100	5,000
13,500 Million Pcs.	9,000 Million Pcs.	40	3 3	1,000	18,000 Million Pcs	4,500 Million Pcs	20	1.65	200
4,50,000 Nos.	1,50,000 Nos.	6	4 3	100	8,00,000 Nos.	1,50,000 Nos.	6	4.3	100
67.2	67.2	15	(20.00	..		..	..	..	..
	.	150	100 00	2,000	..	..	150	100	2,000
		406.4	152 2	67,745			508.8	432 45	58 025

APPENDIX B-1—*concld.*

CHEMICAL AND NON-ENGINEERING UNITS

Sr. No.	Item	(10)+(15)	(12)+(17)	Power Units/ Tonne	Total requirement by 1983-84 (Million Units)
1	2	19	20	21	22
1	Fertilizers				
	(a) Nitrogenous	6,50,000	325	500	502.5
	(b) Phosphatic	3,55,000			
2	Salt	4.00 Million Tonnes	2.3	Nil	Nil.
3	Soda Ash	3,40,000	24	200	8.0
4	Caustic Soda	1,75,000	35.5	4,000	700.00
5	Fluorine Chemicals	60,000	7.5	200	12.00
6	Polyphosphate	15,000	18	200	3.00
7	Industrial Explosives	10,000	4	100	1.00
8	Sugar	3,00,000	30	50	15.00
9	Alcohol	27,000	3.5	50	1.35
10	Acetic Acid	10,000	1.0	50	0.50
11	Cement	2.5 Million Tonnes	100	50	125.00
12	Ceramics and Refractories	90,000	6	50	4.50
13	Glass	97,000	17	200	19.40
14	Vegetable Oil	3,50,000	3.5	50	17.50
15	Vanaspati	87,500	4.7	50	4.40
16	Paper and Pulp	2,25,000	112.5	200	45,00
17	Cigar/Cigarettes	13,500 Million Pcs.	4.95	..	..
18	Auto Tyres and Tubes	3,00,000 Nos.	8.6	..	
19	Heavy Water	67.2	20	..	..
20	Dye-stuffs and Pharmaceuticals	..	200	200	..
					1519.15

APPENDIX B-2

CHEMICAL AND NON-ENGINEERING INDUSTRIES

(Small Scale Sector)

Industry	Year 1978-79			Year 1983-84		
	Value (Rs in crores)	Investment (Rs. in crores)	Employment No.	Value (Rs. in crores)	Investment (Rs. in crores)	Employment No.
Plastic Processing Industry	25	5.3	6,500	34	7.2	9,000
Rubber articles including bicycles tyres and tubes.	2.35	0.8	200	12.6	4.2	1,000
Dyestuffs Pharmaceutical and Fine Chemicals.	15	3.8	3,000	20	3.0	4,000
Other Inorganic and Organic Chemicals.	100	29.2	40,000	120.0	35.0	50,000
Total	142.35	39.1	49,700	186.6	51.4	64,000

APPENDIX

PETRO-

Sr. No.	Item	Capacity (licensed)	Approved (1970-71)	Capacity installed (1970-71)		Capacity expected to materialise by 1973-74 in Gujarat.	
		All India (tonnes)	Gujarat (tonnes)	All India (tonnes)	Gujarat (tonnes)	Quantity (tonnes)	Value (Rs. in crores)
1	2	3	4	5	6	7	8
	Thermoplasts						
1	Polyethylene (L. D.)	65,000	40,000	25,000	..	80,000	28.00
2	Polyethylene (H. D.)	30,000	..	22,000	..	..	..
3	Polystyrene and Copolymer	21,000	9,000	21,000	..	..	..
4	Polypropylene	10,000	..	..	..	30,000	13.50
5	Nylone Moulding Powder/chips	4,300	4,300	..	..	4,300	4.50
6	Polyester Chips	..	..	..	..	3,000	4.50
7	Polymethyl Methacrylate	14,000	7,000	..	..	3,500	2.50
8	Polyvinylchloride	92,000	..	46,500	..	..	..
						1,20,800	53.00
	Synthetic Fibres						
9	Polyster (a) Fibre	24,400	6,100	5,000	..	6,100	12.5
	(b) Filament	..	..	..	..	3,000	7.5
	(c) Film	..	..	..	..	..	..
10	Polypropylene Fibre	5,000	..	..	..	5,000	12.0
11	Acrylic Fibre	4,000	..	300	..	10,000	15
12	Nylon-6 Filament Yarn	12,900	1,800	8,500	..	6,000	12
13	Nylon Kyre Cord	6,500	..	2,300	..	2,000	3
						32,100	62.0
	Synthetic Rubber						
14	Polybutadiene	..	..	..	..	25,000	15
15	Butyl Rubber	..	..	..	..	..	..
						25,000	15
	Intermediates for Plastics and Synthetic Fibres.						
16	Styrene	63,000	30,000	23,000	..	30,000	12
17	Acrylonitrile	24,000	24,000	..	..	24,000	16
18	Caprolactum	20,000	20,000	..	..	20,000	30
19	D. M. T.	24,000	24,000	..	..	24,000	12
20	Vinyl Chloride	1,08,000	..	57,500	..	..	..
21	Methyl Methacrylate	20,000	10,000	..	..	5,000	2.5
22	T. D. I.	15,000	3,000	..	..	3,000	4.5
						1,06,000	77.0
	Chemicals						
23	Ethylene glycol/oxide	10,000	..	10,000	..	20,000	6
24	Detergent alkylate	3,000	3,000	300	300	30,000	10

HEMICALS

Proposed targets for 1978-79 for Gujarat					Perspective targets for 1983 84 for Gujarat				
Total (tonnes)	Additional (tonnes)	Value (Rs. in crores)	Additional invest-ment (Rs in crores)	Direct Additional employ-ment (No.)	Total (tonnes)	Additional (tonnes)	Value (Rs in crores)	Addi-tional invest-ment (Rs. in crores)	Direct additional employ-ment (No)
9	10	11	12	13	14	15	16	17	18
60,000	..	..	.	.	1,00,000	20,000	7	9	350
20,000	20,000	8	8	300	30,000	10,000	4	4	100
15,000	15,000	7 5	7.5	200	25,000	10,000	5	5	200
30,000	..				37,500	7,500	3	4	100
4,300	..	..			5,000	700	0 7	0 35	..
3,000	..	..		..	3,000		..	.	..
3,500	..	.	..	..	7,000	3,500	2 5	3 5	200
30,000	30,000	12	4	140	40,000	10,000	4	1 3	50
1,83,500	65,000	27.5	19 5	740	2,47,500	61,700	28 2	27 15	1,050
7,600	1,500	3	3 5	25	13,600	6,000	12 5	15	120
3,000	..	..	..	..	5,000	2,000	5	9	50
2,000	2,000	5	3	25	2,000	.	..	.	..
5,000		..	..	..	10,000	5,000	12	5	200
10,000	..	..	..	..	16,000	6,000	9	12	400
6,000		..	..	.	10,000	4,000	8	10	500
2,000		..	..	.	3,000	1,000	1.5	1.5	100
35,600	3,500	8 0	6.5	60	59,000	24,000	48 0	52 5	1,370
25,000	..	..	..	..	40,000	15,000	12 0	15	300
5,000	5,000	4.0	3	75	10,000	5,000	4	3	75
30,000	5,000	4 0	3.00	75	50,000	20,000	16 0	18.00	375
30,000	..	..	--	..	50,000	20,000	8 0	4.00	100
30,000	6,000	4	3 5	250	30,000	..	--	..	--
25,000	5,000	7.5	6	125	30,000	5,000	7 5	6	125
24,000	.	.	..	..	30,000	8,000	3	3	75
40,000	40,000	12	7 5	250	1,00,000	60,000	18	12	350
5,000			..	.	7,500	2,500	1 3	2 5	70
6,000	3,000	4.5	4	100	6,000	.			
1,60,000	54,000	23.0	21 0	725	2,53,500	93,500	37.8	37.50	720
20,000				..	30,000	10,000	3	4	100
30,000	..		..	..	40,000	10,000	3	4.5	100

APPENDIX

Sr. No.	Item		Capacity Licensed (approved) (1970-71)		Capacity installed (1970-71)		Capacity expected to materialise by 1973-74 in Gujarat	
			All India (tonnes)	Gujarat (tonnes)	All India (tonnes)	Gujarat (tonnes)	Quantity (tonnes)	Value (Rs. in crores)
1	2		3	4	5	6	7	8
25	Phthalic Anhydride	..	18,000	6,000	12,300	3,000	6,000	3
26	Maleic Anhydride	..	6,000	3,000	..	..	3,000	1.5
27	Phthalate Plasticizer	..	31,000	7,500	14,000	2,500	7,500	7.5
28	Methanol ..	..	43,000	..	30,000	..	..	..
29	Propylene Glycol/Oxide	—	..	—	..	—	—	..
30	2-Ethyl hexanol ..	..	10,000	—	10,000	...	..	..
31	Epichlorohydrine	..	—	—	—	—	—	—
32	Syn. Glycerine —	—	—	—	—	—	—	—
33	Acrylic Ester ..	..	—	—	—	—	3,000	3
34	Carbon Black ..	—	40,000	—	5,000	...	3,000	..
35	Melamine —	—	—	—	—	—	—	—
36	Dyestuff and pharmaceutical	—	—	—	—	—	3,000	2.5
Primary intermediates								
37	Insecticides and Pesticides	—	30,000	6,000	30,000	6,000	10,000	15
38	Synthetic Detergents	—	60,000	10,000	35,000	...	10,000	3
								51.5
							Total —	258.5

C—concld

Proposed targets for 1978 79 for Gujarat: Total (tonnes)	Additional (tonnes)	Value (Rs. in crores)	Additional investment (Rs. in crores)	Direct additional employment (No.)	Perspective targets for 1983-84 for Gujarat: Total (tonnes)	Additional (tonnes)	Value (Rs in crores)	Additional investment (Rs in crores)	Direct additional employment (No.)
9	10	11	12	13	14	15	16	17	18
10,000	4,000	2	2.5	100	15,000	5,000	2.5	3.3	125
5,000	2,000	1	1.3	50	6,000	1,000	0.5	0.7	30
15,000	7,500	7.5	1.5	35	25,000	10,000	10.0	1.0	25
30,000	50,000	4.5	7.5	250	40,000	10,000	1.5	2.25	75
10,000	10,000	5	2.00	125	12,500	2,500	1.3	0.6	30
10,000	10,000	10	7	100	15,000	5,000	5	2.5	50
1,000	1,000	5	0.7	35	1,000	..	..	..	.
..	..	..	..		10,000	10,000	3	5	125
3,000	..	.	.		3,000	..	..	..	.
5,000	5,000	3	1.5	250	10,000	5,000	3	1.5	250
3,000	3,000	4.5	3	75	5,000	2,000	3	2	50
3,000					5,000	2,000	1.6	2	200
10,000			.	.	20,000	10,000	15	2	150
29,000	10,000	3	0.2	100	30,000	10,000	3	0.2	100
.	82,500	45.5	25.2	1,120	2,67,500	92,500	63.4	31.55	1,410
	2,10,000	113.0	75.2	2,710	8,78,100	2,91,700	183.4	156.70	5,025

Columns 10+15 (tonnes)	Columns 12+17 (Rs in crores)	Power average unit / tonne	Total requirement by 1983 84 million units
5,01,700	231.90	1,500	752.6

APPENDIX D

AGRO INDUSTRIES

Sr. No.	Item	Capacity per unit	Fifth Plan: No. of units	Fifth Plan: Total investment (Rs. in lakhs)	Fifth Plan: Total employment (No.)	Sixth Plan: No of units	Sixth Plan: Total investment (Rs. in lakhs)	Sixth Plan: Total employment (No.)
1	2	3	4	5	6	7	8	9
1	Cattle Feed Factories (compound feed)	3-6 tonnes per hour	N-1 C-1 S-1 K-0	120	200	N-2 C-1 S-1 K-1	200	350
2	Cold storages ..	2,000 tonnes storage capacity per unit.	N-2 C-2 S-4 K-2	150	200	N-5 C-5 S-5 K-5	350	400
3	Oil Extraction Units	100 tonnes of cake per day.	N-1 C-1 S-1 K-1	200	250	N-1 C-1 S-1 K-1	200	250
4	Compost Manure Plant	150 tonnes per day	N-0 C-1 S-2 K-1	160	200	N-1 C-2 S-1 K-1	200	250
5	Rice / Pulse Mills ..	1-2 tonnes per hour	N-2 C-2 S-2 K-2	80	160	N-4 C-4 S-4 K-0	120	240
6	Guar Gum Processing	30 tonnes per day	N-1 C-0 S-0 K-0	40	60	N-2 C-0 S-0 K-0	80	120
7	Dehydration of Fruits and Vegetables.	1 tonne powder per day.	N-0 C-1 S-1 K-1	80	80	N-1 C-1 S-1 K-0	80	80
8	Canning of Fruits and Vegetables.	6 tonnes fruits or vegetables per day	N-1 C-1 S-1 K-1	60	200	N-1 C-1 S-1 K-1	60	200
9	Protein Flour and isolates.	5 tonnes isolates per day.	N-1 C-0 S-0 K-1	200	200	N-0 C-0 S-1 K-1	200	200
10	Agro Service Centres	..	N-10 C-10 S-10 K-10	60	400	N-10 C-10 S-10 K-10	60	400
11	Agro Service Complex	..	N-1 C-1 S-2 K-2	90	180	N-2 C-2 S-1 K-1	90	180
12	Tractors and Agricultural implements manufacturing.	10,000 tractors per year	N-0 C-1 S-0 K-0	700	3,500	..	..	..
13	Furfural from agricultural waste.	50 tonnes per day	N-1 C-0 S-1 K-0	100	200	N-0 C-1 S-0 K-1	100	200
			Total	2.040	5,830		1,740	2,870

N=North Gujarat S=South Gujarat C=Central Gujarat K=Saurashtra

APPENDIX D—*concld.*

SUMMARY

Region	Fifth Plan		Sixth Plan	
	Investment (Rs in lakhs)	Employment (No.)	Investment (Rs. in lakhs)	Employment (No)
North Gujarat	375	648	464	789
Central Gujarat .. .	951	3,960	434	749
South Gujarat .. .	387	686	430	6·0
Saurashtra	327	530	412	652
	2,040	5,830	1,740	2,870

APPENDIX E

TEXTILE INDUSTRIES

Sr. No.	Item	Unit	1979	1984
1	Estimated population (All-India) ..	Million	666	754
2	Per capita estimated cloth requirement	Metres	16.85	17.70
3	Requirement of cloth (All-India) ..	Million Metres	11,222	13,345
4	Additional capacity required (All-India).	Do.	2,473 (By 1979)	2,123 (By 1984)
5	Gujarat's share in additional requirement.	Do.	742 (By 1979)	637 (By 1984)
6	Gujarat's requirement of additional capacity —			
	(a) Spindles	No. in Lakhs	2.60 (By 1979)	13.25 (By 1984)
	(b) Looms	No.	5,000 (By 1979)	26,500 (By 1984)

APPENDIX F

APPENDIX E

TEXTILE INDUSTRIES

Sr. No.	Item	Unit	1979	1984
1	Estimated population (All-India) ..	Million	666	754
2	Per capita estimated cloth requirement	Metres	16.85	17.70
3	Requirement of cloth (All-India) ..	Million Metres	11,222	13,345
4	Additional capacity required (All-India).	Do.	2,473 (By 1979)	2,123 (By 1984)
5	Gujarat's share in additional requirement.	Do.	742 (By 1979)	637 (By 1984)
6	Gujarat's requirement of additional capacity —			
	(*a*) Spindles	No. in Lakhs	2.60 (By 1979)	13.25 (By 1984)
	(*b*) Looms	No.	5,000 (By 1979)	26,500 (By 1984)

APPENDIX F

APPENDIX

ENGINEERING

Perspective

Sr. No.	Item	Production		Fourth Plan	Fifth	
		Gujarat	India	Target	Quantity	Value (Rs. in crores)
1	2	3	4	5	6	7
		(Tonnes)	(Tonnes)	(Tonnes)	(Tonnes)	
1	Steel billets by continuous casting.	..	..	..	50,000	3.50
2	Mild steel finished including steel skelp.	..	..	..	..	..
3	Steel castings and forgings.	781 (1968-69)	94,900	4,45,000	10,000	5.00
4	Steel pipes and tubes (including stainless steel pipes).	39,478 (1967)	2.06 lakh	9 lakh	1,00,000	12.00
5	Pig iron	..	70.78 lakh	127 lakh	3,00,000	12.50
6	Grey iron castings ..	..	..	25 lakh	50,000	2.50
7	Cast iron pipes ..	..	1.31 lakh	11 lakh	50,000	10.00
8	Alloy and special steel finished.	..	43,000 (1968-69)	2.5 lakh	50,000	25.00
9	Steel strips including alloy steel.	..	..	1,26,000	50,000	15.00
						85.50
10	Steel fabrications including chemical plants and vessels.	..	..	..	15,000	30.00
11	Steel wires and ropes	..	..	..	25,000	5.00
12	Sponge iron ..	..	..	..	2,00,000	6.00
13	Alumina Aluminium smelter Rolling mill and fabrication.	.. 0.35 (1969)	1.25 lakh 35,017 (1968)	2.30 lakh 1.10 lakh	.. ..	15.00
14	Non-ferrous castings rolled product, extrusions powder metallurgy units.	..	4,498	40,000	3,600	7.00
15	Heavy Electrical Complex.	..	..	..	..	10.00
16	Electrical Engineering.					
	Transformers ..	45,370 kva (1968)	8.3 million kva (1968-69)	11.9 million kva.	2 lakh kva.	2.00
17	Motors ..	33,460 H. P.	2.63 million H.P.	3.40 million H. P.	1 lakh H.P.	1.00
						76.00
18	Control gear and Switch gear.	Worth Rs. 146.56 lakhs (1969)	..	Worth Rs. 40 million	Worth Rs. 5 crores	5.00
19	Domestic refrigerators.	..	50,051 Nos.	65,000 Nos.	10,000 Nos.	1.00

F ..

INDUSTRIES (LARGE SCALE)

Planning

Plan		Sixth Plan				
Direct employment (No.)	Investment (Rs. in crores)	Quantity	Value (Rs. in crores)	Employment (No)	Investment (Rs in crores)	Suggested Location
8	9	10	11	12	13	14
500	3.00	(Tonnes) 50,000	3 50	500	1.50	Bhavnagar / Broach
..	..	60,000	6 00	1,500	5.00	Broach / Ahmedabad
1,000	5 00	20,000	10 00	600	5.00	Baroda / Ahmedabad
500	6.00	2,00,000	7.00	600	5.00	Ahmedabad
2,000	9 20	5,00,000	20 00	2,500	12.00	Bhavnagar
500	1 00	75,000	5 00	1,500	2.00	All over Gujarat
200	5.00	50,000	10.00	200	5.00	Ahmedabad
500	10.00	50,000	25.00	600	20 00	Navsari / Broach
250	10.00	50,000	15.00	200	10 00	Navsari / Mehsana
5,450	49.20		101.50	8,200	65 50	
2,000	10.00	15,000	30.00	1,000	10.00	Ahmedabad/Baroda
200	1 00	60,000	10 00	400	2 00	South Gujarat
500	15 00	5 lakh	15 00	600	25 00	Kutch/Broach
5,000	30.00	1 lakh	50 00	8,000	100.00	Kutch/Jamnagar
500	2 00	3,600	7.00	700	2 00	Anywhere
5,000	20 00	..	30 00	10,000	10 00	
200	0.50	5 lakh kva	5.00	400	1.00	All over Gujarat
100	0.25	3 lakh H.P.	3.00	400	1 00	All over Gujarat
13,600	78 75		150 00	18,500	151.00	
1,000	2 00	Rs. 10 crores	10 00	1,500	3 00	Baroda/Ahmedabad
200	0 50	20,000 Nos.	2 00	200	0 40	Rajkot/Jamnagar

APPENDIX

ENGINEERING

Perspective

Sr. No.	Item	Production		Fourth Plan	Fifth	
		Gujarat	India	Target	Quantity	Value (Rs. in crores)
1	2	3	4	5	6	7
		(Tonnes)	(Tonnes)	(Tonnes)	(Tonnes)	
1	Steel billets by continuous casting.	..	..	..	50,000	3.50
2	Mild steel finished including steel skelp.	..	..	..	..	..
3	Steel castings and forgings.	781 (1968-69)	94,000	4,45,000	10,000	5.00
4	Steel pipes and tubes (including stainless steel pipes).	39,478 (1967)	2.66 lakh	9 lakh	1,00,000	12.00
5	Pig iron	..	70.78 lakh	127 lakh	3,00,000	12.50
6	Grey iron castings ..	..	..	25 lakh	50,000	2.50
7	Cast iron pipes ..	..	1.31 lakh	11 lakh	50,000	10.00
8	Alloy and special steel finished.	..	43,000 (1968-69)	2.5 lakh	50,000	25.00
9	Steel strips including alloy steel..	..	..	1,25,000	50,000	15.00
						85.50
10	Steel fabrications including chemical plants and vessels.	..	..	..	15,000	30.00
11	Steel wires and ropes	..	..	..	25,000	5.00
12	Sponge iron ..	..	..	..	2,00,000	6.00
13	Alumina	..	1.25 lakh	2.30 lakh	..	15.00
	Aluminium smelter	6.35 (1969)	35,017 (1968)	1.10 lakh	..	
	Rolling mill and fabrication.					
14	Non-ferrous castings rolled product, extrusions powder metallurgy units.	..	4,498	40,000	3,600	7.00
15	Heavy Electrical Complex.	..	..	..	..	10.00
16	Electrical Engineering.					
	Transformers ..	45,370 kva (1968)	8.3 million kva (1968-69)	11.9 million kva.	2 lakh kva.	2.00
17	Motors ..	33.460 H. P.	2.63 million H.P.	3.40 million H. P.	1 lakh H.P.	1.00
						76.00
18	Control gear and Switch gear.	Worth Rs. 146.56 lakhs (1969)	..	Worth Rs. 40 million	Worth Rs. 5 crores	5.00
19	Domestic refrigerators.	..	50,051 Nos.	65,000 Nos.	10,000 Nos.	1.00

F

INDUSTRIES (LARGE SCALE)

Planning

Plan		Sixth Plan				
Direct employment (No.)	Investment (Rs. in crores)	Quantity	Value (Rs. in crores)	Employment (No.)	Invest-ment (Rs. in crores)	Suggested Location
8	9	10	11	12	13	14
500	3.00	(Tonnes) 50,000	3 50	500	1.50	Bhavnagar / Broach
..	..	60,000	6.00	1,500	5.00	Broach / Ahmedabad
1,000	5.00	20,000	10 00	600	5 00	Baroda / Ahmedabad
500	6 00	2,00,000	7 00	600	5.00	Ahmedabad
2,000	9.20	5,00,000	20 00	2,500	12 00	Bhavnagar
500	1 00	75,000	5.00	1,500	2 00	All over Gujarat
200	5.00	50,000	10.00	200	5.00	Ahmedabad
500	10.00	50,000	25 00	600	20 00	Navsari / Broach
250	10.00	50,000	15 00	200	10 00	Navsari / Mehsana
5,450	49.20		101 50	8,200	65 50	
2,000	10 00	15,000	30 00	1,000	10.00	Ahmedabad/Baroda
200	1.00	50,000	10 00	400	2 00	South Gujarat
500	15 00	5 lakh	15 00	600	25 00	Kutch/Broach
5,000	30 00	1 lakh	50 00	5,000	100.00	Kutch/Jamnagar
800	2 00	3,600	7 00	700	2.00	Anywhere
5,000	20 00	..	30 00	10,000	10 00	
200	0.50	5 lakh kva	5 00	400	1 00	*All over Gujarat*
100	0.25	3 lakh H.P.	3.00	400	1.00	All over Gujarat
13,600	78.75		150 00	18,600	151.00	
1,000	2 00	Rs. 10 crores	10 00	1,500	3 00	*Baroda/Ahmedabad*
200	0 50	20,000 Nos	2 00	200	0 40	*Rajkot/Jamnagar*

APPENDIX

Sr. No.	Item	Production		Fourth Plan	Fifth	
		Gujarat	India	Target	Quantity	Value (Rs. in crores)
1	2	3	4	5	6	7
20	Electric fans ..	1,060 Nos. (1969)	14.81 lakh Nos. (1968-69)	30 lakh Nos.	2 lakh Nos.	3.00
21	Electric lamps (including miniature lamps)	..	11,97,83,000 Nos.	205 million Nos.	5 million Nos.	5.00
22	Flourescent tubes ..	..	..	205 million Nos.	..	..
23	Air-conditioners ..	Rs. 75.34 lakhs	12,960 Nos.	65,000 Nos.	10,000 Nos.	3.00
24	Electric appliances, washing machine, dish washing, dry cleaning and vacuum cleaners.	..	..	..	5,000 Nos.	0.50
25	Water coolers ..	..	35.76 lakh Nos.	..	30.080 Nos.	3.00
						20.50
	Electronics					
26	Components and dye manufacturing unit.	..	..	Rs. 300 million.	Rs. 5 crores.	5.00
27	Instruments ..	..	..	Rs. 50 million.	Rs. 4 crores.	4.00
28	Entertainment electronics.	..	..	Rs. 7 crores	Rs. 7.5 crores.	7.50
29	House service meters	4,167 Nos. (1969)	11.09 lakh Nos.	30 lakh Nos.	1 lakh Nos	0.50
29A	Tool room for electronics.	..	..	..	Rs. 3.00 crores	3.00
30	Electric cables ..	19849 kms. (1969)	3691 lakh metres and 2362 kms.	1,200 million metres 20,000 kms.	1 crore metres.	1.00
31	A. C. S. R. Conductors.	4492 tonnes (1969)	62,500 tonnes (1968-69)	1.25 lakh tonnes	10,000 tonnes	8.00
32	Winding wires ..	..	12,732 tonnes	40,000 tonnes	500 tonnes	7.00
						36.00
33	Arc welding electrodes.	..	1,771 lakh R. metres	..	120 million R.F.T.	1.00
34	Dry batteries ..	..	436.4 million Nos.	600 million Nos.	60 million Nos.	5.00
35	Storage batteries ..	..	9.40 lakh Nos.	18 lakh Nos.	20,000 Nos.	4.00
	Transport equipment					
36	Commercial vehicles ..	..	35,600 Nos. (1968-69)	85,000 Nos.	..	..
37	Cars, jeeps and station wagons.	..	44,604 Nos.	70,000 Nos.	..	..

F—contd.

Plan		Sixth Plan				
Direct employment (No)	Investment (Rs. in crores)	Quantity	Value (Rs. in crores)	Employment (No)	Investment (Rs. in crores)	Suggested location
8	9	10	11	12	13	14
500	1.00	5 lakh Nos	7.50	500	1.00	Any place
500	1.00	5 million Nos.	5 00	2,100	1.00	Nadiad/Baroda.
200	0 50	10,000 Nos.	3 00	200	0 50	Panchmahals.
200	0 40	75,000 Nos.	0.50	100	0 20	All over.
500	0.50	30,000 Nos.	3.00	400	0.40	S E.
3,100	5 90	31 00	31 00	5,000	6 50	
500	2 50	Rs. 5 crores	4 00	350	2 50	Anywhere
500	2 00	Rs. 4 crores	4 00	500	2 00	Anywhere
1,500	1.00	Rs. 15 crores	15.00	1,500	2 00	Anywhere
200	0.20	2 lakh Nos.	1 00	500	0.40	Baroda
500	1.50	Rs. 6 crores	6 00	1,000	3.00	Ahmedabad
200	0 50	1 crore metres	1 00	200	0.40	Vapi/Bulsar
200	0 50	15,000 tonnes	12.00	300	0.50	Anywhere
1,200	1 50	500 tonnes	7.00	1,200	1.50	Surat
4,800	9.60	50,00	50.00	5,550	12 30	
100	0.05	150 million Nos.	1 00	2,00	0 20	North Gujarat
500	1.50	100 million Nos.	8 00	500	2 00	Baroda
600	1.00	40,000 Nos.	8.00	1,000	1 50	Ahmedabad
..	..	30,000 Nos.	120 00	20,000	60.00	Vapi/Surat
..	..	50,000 Nos.	75.00	15,000	20.00	Panchmahals

APPENDIX

Sr. No.	Item	Production		Fourth Plan	Fifth	
		Gujarat	India	Target	Quantity	Value (Rs. in crores)
1	2	3	4	5	6	7
38	Motor cycles, scooters, mopeds and three wheelers	..	84,600 Nos. (1968-69)	2.10 lakhs Nos.	24,000 Nos.	5.00
39	Automobile ancillaries	..	..	Rs. 1,000 million	26.25 lakh Nos.	1.50
40	Bicycle (complete) ..	..	19.60 lakh Nos. (1968-69)	32 lakh Nos.	..	..
41	Bicycle parts ..	Rs. 25.10 lakhs (1964-65)	Rs. 98.70 million	Rs. 200 million	Rs. 2 crores	2.00
42	Ship building ..	..	2 ships (1968-69)	6 Ships	..	..
	Machinery					
43	Material handling equipment and machinery	Rs. 11.19 lakhs	8,000 tonnes (1968-69)	20,000 tonnes	Rs. 3 crores	3.00
44	Textile machinery ..	..	Rs. 138 million (1968-69)	Rs. 150 million	Rs. 2 crores	2.00
45	Paper machinery ..	..	Rs. 2.7 crores	Rs. 15 crores	Rs. 1 crore	1.00
46	Sugar machinery ..	..	Rs. 11.8 crores	Rs. 21 crores	Rs. 5 crores	5.00
47	Printing machinery ..	..	Rs. 10 lakhs	Rs. 10 lakhs	Rs. 2 crores	2.00
48	Metallurgical and other heavy equipment	..	25,000 tonnes (1968-69)	75,000 tonnes	Rs. 5 crores	5.00
49	Dairy machinery ..	..	..	Rs. 50 million	Rs. 1 crore	1.00
						19.00
50	Building and road construction machinery	..	..	..	..	..
51	Power boilers ..	..	0.4 million (1968-69)	1.30 million kW.	Rs. 2 crores	2.00
52	Diesel engines (stationary)	12123 Nos. (1969)	1.18 lakh Nos. (1968-69)	2 lakh Nos.	20,000 Nos.	4.00
53	Power driven pumps (including special types)	111.6¼ thousand Nos. (1969)	3.5 lakh Nos. (1968-69)	4.50 lakh Nos.	60,000 Nos.	12.00
54	Air compressors ..	1173 Nos. (1967)	6200 Nos.	Rs. 160 million	Rs. 1 crore	1.00
55	Machine tools ..	Rs. 20.53 lakhs (1969)	Rs. 247 million (1968-69)	Rs. 760 million	Rs. 6 crores	6.00
56	Agricultural tractors..	..	15,400 Nos. (1968-69)	68,000 Nos.	10,000 Nos.	20.00
						45.00

Plan—contd.

Direct employment (No.) 8	Investment (Rs. in crores) 9	Quantity 10	Sixth Plan: Value (Rs. in crores) 11	Employment (No.) 12	Investment (Rs. in crores) 13	Suggested Location 14
500	1.50	69,000 Nos.	14 00	1,700	3 00	Ahmedabad
650	0 55	55 lakh Nos.	2 50	1,200	1.00	Anywhere
..	.	28 lakh Nos	4 00	1,000	1.00	Bhavnagar, Jamnagar, Rajkot
600	0.50	Rs 2 crores	2 00	600	0 50	Anywhere in the State
2,950	5 10		234 50	41,500	70 20	
..	..	10 ships (below 10,000 tonnes)	20 00	5,000	10.00	Sikka
500	1 00	Rs 6 crores	6 00	300	2 00	South Gujarat
100	0.50	Rs 4 crores	4 00	75	1.00	South Gujarat
200	0 50	Rs 1 crore	1.00	160	0.40	Ahmedabad
500	2 50	Rs. 5 crores	5 00	500	2 00	Bhavnagar
300	0 75	Rs. 1 crore	1 00	200	0 40	Ahmedabad
500	2 00	Rs. 6 crores	6 00	500	2.00	Baroda
150	0 50	Rs. 1.5 crores	1 50	200	0.72	Ahmedabad
2,250	7.75	..	44 50	6,925	18.52	
.	..	Rs. 1 crore	1 00	200	0.50	Baroda
500	0 50	Rs 4 crores	4 00	1,000	1.00	Ahmedabad
500	1 00	20,000 Nos.	4 00	500	1.00	Rajkot
300	0.70	60,000 Nos.	12.00	300	[illegible]	Baroda
200	0 50	Rs. 2 crores	2.00	200	[illegible]	[illegible]
500	2 00	Rs 10 crores	10 00	1,100	[illegible]	[illegible]
1,500	5 00	[illegible],000 Nos.	40.00	[illegible]	[illegible]	[illegible]
3,500	9.70		[illegible]	[illegible]	[illegible]	

APPENDIX

Sr. No.	Item	Production: Gujarat	Production: India	Fourth Plan Target	Fifth: Quantity	Fifth: Value (Rs. in crores)
1	2	3	4	5	6	7
57	Crawler tractors shovels, excavators dumpers and scrapers.	..	..	1925 Nos.	400 Nos.	3.00
58	Power tillers ..	..	590 Nos. (1968-69)	1,35,000 Nos.	10,000 Nos.	7.50
59	Industrial control instruments.	..	..	Rs. 15 crores	Rs. 5 crores	5.00
60	Typewriters ..	..	43,750 Nos.	2 lakhs Nos.	..	..
61	Sewing machines ..	..	4.27 lakhs Nos. (1968-69)	6 lakhs Nos.	1 lakh Nos.	5.00
62	Watches, clocks and time pieces.	67,021 Nos. (1970)	74,532 Nos.	Rs. 2.18 million	Watches 4 lakhs pcs. Clocks 2 lakhs pcs.	6.00
63	Fuel injection equipment.	..	..	..	Rs. 5 crores	5.00
64	Plastic processing machinery.	..	..	..	200 Nos.	400
65	Ball and roller bearing complex.	..	12 millions per year	..	20 million rings 10 million bearings	6.00
					Total	41.50
66	Gas cylinders ..	..	..	..	..	1.00
67	Tool room (for engineering industry).	..	..	..	..	1.00
68	Forging units ..	..	..	..	..	2.00
69	Heat treatment ..	..	..	..	..	0.50
70	Three wheelers ..	..	..	..	..	8.00
71	Zinc smelter ..	..	..	..	..	..
					Total ..	12.50
					Grand Total ..	354.50

Plan: Direct employment (No)	Plan: Investment (Rs. in crores)	Sixth Plan: Quantity	Sixth Plan: Value (Rs. in crores)	Sixth Plan: Employment (No)	Sixth Plan: Investment (Rs. in crores)	Suggested location
8	9	10	11	12	13	14
670	0.40	600 Nos.	5 00	200	1.00	Baroda
450	0.60	20,000 Nos.	15.00	500	0 60	Ahmedabad
1,000	1 00	Rs. 5 crores	5 00	1,000	1.00	Jamnagar, Baroda
.		10,000 Nos.	2 00	500	0 80	Jamnagar, Baroda
1,000	2.00	1 lakh Nos.	5 00	1,000	2 00	Jamnagar
1,000	3 00	Watches 2 lakhs pcs. Clocks 1 lakh pcs.	2 00	500	1 00	Baroda, Rajkot
1,000	1 50	Rs. 7 crores	7.00	700	1.50	Baroda
200	0.80				..	Ahmedabad
500	10 00	30 million rings 30 million bearings	15 03	500	10.00	Ahmedabad
5,750	19 30		57 00	4,000	17 90	
300	0 50	.	1 00	150	0.50	
400	1.00	..	1.00	400	1.00	
600	2.00	..	2 00	600	2 00	
100	0 50	..	0.50	100	0.50	
1,000	2.00	..	12.00	1,200	3 00	
1,000	5.00	..	15 00	2,000	25.00	
3,400	11.00		31.50	4,150	32 00	
45,000	190.30		773.00	101,225	400.62	

APPENDIX F-1

ENGINEERING INDUSTRIES (SMALL SCALE SECTOR)

Sr. No.	Items	Perspective Planning—Fifth Plan Yearly Target					Sixth Plan Yearly Target				
		No. of Units	Quantity	Value Rs.	Direct employment (No.)	Investment Rs.	No. of Units	Quantity	Value Rs.	Direct employment (No.)	Investment Rs.
1	Steel furniture (10 per cent of additional demand in Fifth Plan)	25	5,000 tonnes	2.5 crores	500	50 lakhs	50	10,000 tonnes	5.00 crores	1,000	1.00 crore
2	Bolts Nuts (5 per cent of additional demand in Fifth Plan).	10	5,000 tonnes	1.5 crores	200	20 lakhs	20	6,000 tonnes	3.0 crores	400	40 lakhs
3	Rolling Shutters	5	1,000 tonnes	60 lakhs	160	10 lakhs	10	2,000 tonnes	120 lakhs	200	20 lakhs
4	Welded Wire Mesh	4	10,000 tonnes	3 crores	200	30 lakhs	2	5,000 tonnes	1.5 crores	100	15 lakhs
5	Pressure Diecasting (approximately 10 per cent of the additional demand)	10	5,000 tonnes	7.5 crores	300	60 lakhs	10	5,000 tonnes	7.5 crores	300	80 lakhs
6	Tin containers barrels drums (10 per cent of additional demand in Fifth Plan)	20	30,000 tonnes	15 crores	1,000	1.5 crores	10	15,000 tonnes	7.5 crores	500	75 lakhs
7	Grey Iron Castings (Marginal expansion already large capacity exists)	10	5,000 tonnes	1 crore	150	40 lakhs	20	10,000 tonnes	2 crores	300	80 lakhs
8	Machine Tools (accessories production at 10 per cent)	10	..	60 lakhs	200	20 lakhs	20	..	120 lakhs	400	40 lakhs
9	Aluminium Utensils (20 per cent of additional demand in Fifth Plan)	6	6,000 tonnes	70 crores	100	10 lakhs	12	12,000 tonnes	14 crores	200	25 lakhs
10	Auto Ancillaries (10 per cent of additional demand in Fifth Plan)	20	..	5 crores	400	80 lakhs	20	..	5 crores	400	80 lakhs
11	Electrical Hardware	20	..	2 crores	400	40 lakhs	20	..	2 crores	400	40 lakhs
12	Electrical Appliances	10	..	1 crore	200	40 lakhs	20	..	2 crores	400	80 lakhs
13	A. A. C. and A. C. S. R. Conductor ..	4	1,000 tonnes	1.2 crores	40	20 lakhs	5	2,000	1.5 crores	50	25 lakhs

	Electronics									
14	Components	20	..	1 crore	200	50 lakhs	40	..	2 crores	400	1 crore
15	Assembly Units	40	..	2 crores	200	20 lakhs	40	..	2 crores	200	20 lakhs
16	Electric Motors (5 per cent of additional demand in Fifth Plan).	5	75,000 kW.	1 crore	100	50 lakhs	10	1,50,000 kW.	2 crores	200	1 crore
17	Transformers (5 per cent of additional demand in Fifth Plan)	5	2,00,000 kW.	1 crore	100	50 lakhs	10	2,00,000 kva	2 crores	200	1 crore
18	Razor Blades (25 per cent of additional demand in Fifth Plan)	2	120 million Nos.	20 lakhs	50	15 lakhs	4	250 million Nos.	40 lakhs	50	20 lakhs
19	Automobile Radiators .. .	4	40,000 Nos.	80 lakhs	200	40 lakhs	4	40,000 Nos.	80 lakhs	200	40 lakhs
20	Insecticides sprayers and dusters (Manually operated)	26	..	3.12 crores	500	1.00 crore	26	.	3.12 crores	500	1 crore
21	Machine Screws	150	3,525 million Nos.	15.00 crores	1,500	1.50 crores	150	3,525 million Nos.	15 00 crores	1,500	1.50 crores
22	Miniature Bulbs	10	11 million Nos.	5 00 crores	300	1.00 crore	10	12 million Nos.	5 00 crore	300	1.00 crore
23	Water Meters	2	24,000 Nos.	4.80 lakhs	60	2.00 lakhs	2	24,000 Nos.	4 8 lakhs	60	2 00 lakhs
24	Ancillary Industry to Petrochemical industry.	75	.	1 80 crores	1,875	0 15 crores	94	...	3.76 crores	2,820	0 04 crores
25	Ancillary Industry to Chemical Industries.	1063		25 51 crores	20,575	5 39 crores	539	..	21.57 crores	16,170	5 39 crores
26	Ancillary Industries to Engineering Industry.	1315		31 56 crores	32,875	7 89 crores	1,901	..	76 07 crores	57,030	10.01 crores
27	Ancillary Industries to Textile Industries	177		4 25 crores	4,425	1 06 crores	118		4 72 crores	3,540	1.18 crores
28	Printing note books, account books etc.	25		1 00 crore	250	75 00 lakhs	50	.	2 00 crores	500	1.5 crores
29	Stationery including jem clips, pins, stapling m/cs., punching m/cs etc.	20		1 crore	200	60 lakhs	40		2 crores	400	1.2 crores

APPENDIX F-1—*concld.*

Sr. No.	Items	Perspective Planning—Fifth Plan Yearly Target					Sixth Plan Yearly Target				
		No. of Units	Quantity	Value Rs.	Direct employment (No.)	Investment	No. of Units	Quantity	Value Rs.	Direct employment (No.)	Investment Rs.
30	Domestic sprayers of different types and for different purposes.	10	..	30 lakhs	100	20 lakhs	20	..	60 lakhs	200	40 lakhs
31	Domestic hardware and locks and building requisites,	25	..	1 crore	250	75 lakhs	35	..	1.40 crores	350	1.05 crores
32	Sports Goods	10	..	50 lakhs	200	30 lakhs	25	..	1.25 crores	500	75 lakhs
33	Educational instruments and toys.	10	..	60 lakhs	150	30 lakhs	25	..	1.5 crores	375	75 lakhs
	Total ..	3157		207.62 crores	73,890	30.53 crores	3371	...	200.61 crores	00,085	40.40

APPENDIX G

COTTAGE INDUSTRIES

Financial Progress of Plan Schemes in Fourth Five Year Plan and Proposed Outlay for Fifth and Sixth Five Year Plans

(Rs. in lakhs)

Sector/Head of development	Sub sector	Fourth Plan provision	Expenditure 1969-70	Expenditure 1970-71	Likely expenditure 1971-72	Likely expenditure 1972-73	Likely expenditure 1973-74	1969-74 (Total expenditure)	Proposed provision in Fifth Plan	Proposed provision in Sixth Plan
1	2	3	4	5	6	7	8	9	10	11
Village and Cottage Industries										
State Plan Schemes :										
	1. Khadi and Village Industries ..	23.50	9.00	8.81	5.00	5.00	6.00	32.81	47.00	94.00
	2. Handloom ..	40.00	4.47	4.19	5.00	5.07	7.12	20.75	40.00	60.50
	3. Powerloom ..	25.00	2.96	5.43	3.00	5.00	6.00	22.30	50.00	75.00
	4. Handicrafts ..	13.00	3.10	1.33	6.00	4.87	4.64	19.94	30.00	40.00
	5. Coir ..	0.50	..	..	..	0.30	0.20	0.50	0.60	0.70
	6. Cottage Industries ..	72.50	7.22	8.78	11.70	16.90	18.53	63.15	285.00	310.00
	Total 1 to 6 (State Plan Schemes) ..	174.50	26.75	28.54	30.70	38.01	41.51	165.54	452.60	570.20
Centrally Sponsored Schemes	..	50.0	2.12	2.76	5.16	5.10	5.10	20.36	25.80	51.00
	Grand Total (State Plan and Centrally Sponsored Schemes)	224.50	28.87	31.30	35.86	43.20	46.67	185.00	478.40	621.20

APPENDIX G-1

COTTAGE INDUSTRIES

Physical and Financial Targets and Employment Potential for Fifth and Sixth Plans

No.	Item	Fourth Plan		Perspective Fifth Plan			Perspective Sixth Plan			Location suggested (district)
		Unit	Target	Target	Invest-ment (Rs. in lakhs)	Direct employment (No.)	Target	Invest-* ment (Rs. in lakhs)	Direct employment (No.)	
1	2	3	4	5	6	7	8	9	10	11
A	330 Khadi and Village Industries ..	..			47.00	15,000		94.00	30,000	Location cannot be given as industries are scattered.
B	Handloom ..	..		..	..	..				
	331. Share capital loans to weavers ..	No.	2,750	1,300	1.00	1,300	1,900	1.50	1,900	do.
	333. Training of weavers ..	..			0.55			0.55		
	334. Sale of handloom cloths ..	Rs. in lakhs	340	500	30.00	..	650	40.00		
	335. Sale Promotion Scheme ..	..			0.65			0.65		
	(a) Societies to be assisted ..	No.	10	20	..	..	20	..	..	
	(b) Special weeks to be celebrated.	No.	5	5	..	..	5	..	..	
	336. Financial assistance to C. F. As for advance of loans from their own funds and guarantee for lossess at subsidised rate of interest.	Rs. in lakhs	1.50	..	2.50	..	..	2.50	..	
	337. Supply of improved looms and accessories.	Rs. in lakhs	2.00	..	5.00	..	..	5.00	..	
	338. Dye-houses ..	No.	2.00	2	0.30	..	2	0.30	..	
	339. Spinning Mills ..	No.	2 (Expansion)	..	..	..	..	..	..	
	Total — B ..				40.00	1,300		50.50	1,900	

*In these columns provisions proposed in the Fifth and Sixth Plans are mentioned.

Item	Unit								Remarks
C. Powerloom :									
340 Powerloom	No.	800	800	50 00	900	1,200	75 00	1,350	Locations will be around Co-operative and other Spinning Mills.
Total-C ..(Reduced to 400)				50.00	900		75.00	1,350	
D. Handicrafts					600			1,000	
341 (a) Emporia	No.		2	15 00		2	23 00		Bombay, Calcutta, Madras, Secunderabad.
(b) Sales Depots.	No.	16	5	5,20		5	5.63		
342 Show Cases	No.	2	2	0 30		2	0 3		Locations cannot be given for other schemes as handicrafts are scattered.
343 Competition of Handicrafts	No	5	5	1 00		5	1 00		
344 Export Promotions	..			0 50			0 75		
345 (a) New societies to be organised	No.		5			5			
(b) Societies to be assisted	No.	35		1 00			1.00		
346 Individuals to be assisted	No.	40	25	1 00		25	1 15		
347 State Design Centre ..	No	1	1 (Expansion)	5.00		1 (Expansion)	6 00		
349 Rural Crafts Museum to be assisted	No			1.00			1.10		
				30.00					

APPENDIX G-1—*concld.*

No.	Item	Fourth Plan		Perspective Fifth Plan			Perspective Sixth Plan			Location suggested (district)
		Unit	Target	Target	Investment (Rs. in lakhs)	Direct employment (No.)	Target	Investment (Rs. in lakhs)	Direct employment (No.)	
1	2	3	4	5	6	7	8	9	10	11
E	**Coir :**									
351	Training School for Coir. ..	No.	1	1	0.60		1	0.70		Junagadh district.
	Trainees to be trained			75			75			
	Total-E				0.60	1600		0.70	1,900	Locations are not given as industries are scattered.
F	**Cottage Industries :**									
	Existing Schemes.									
352	Trainees to be trained in District Training and Service Institutes.									
	(a) Number of Institutes	No.	3	3 (Expansion)	5.63	..	3 (Expansion)	7.00		
	(b) Persons to be trained			450			450			
353	Diamond Jubilee Cottage Industries Institute—Persons to be trained.	No.		500	20.00	..	750	30.00		Baroda
354	Rural Workshops	No.	10	36	15.12	..	48	20.16		
355	(a) Individuals to be assisted	No.	500	1,000 }	47.50	..	1,500 }	89.0[illegible]		
	(b) C. F. As. to be assisted	No.	4	5 }			7 }			
356	Individuals and Societies to be assisted for concessional rate of interest by C. F. As. from their own funds and guarantee for losses.									
	(a) Individuals	No.	1,000	400 }	5.00	..	400 }	5.25		
	(b) Societies	No.	400	100 }			100 }			
357	Societies to be granted share capital contribution :									
	(a) Societies	No.	40	50	10.00	..	50	15.25	..	
	(b) Urban Banks			15	12.50		20	20.00	..	
	(c) Industrial Co-operative Banks			2	10.00		2	10.00	..	

	Item	Unit								Remarks
358	Societies to be granted managerial subsidy	No	200	75	2.25		100	2.50		.
359	Secretaries cadre scheme	Rs.	1.00		1.00			1.60		
361	Numb r of worksheds and godowns	No	25	33	4 00		38	4.75		.
362	Branches of Industrial Co-operative Banks	No.	11	20	4 00		20	4.00		
363	Societies to be given assistance for sale of Cottage Industries Products.	No	100	70	2 00		70	2.00		.
364	Administrative and Supervisory Staff	Rs.	2 82		2 00			10 00		
365	Societies to be revitalised	No	106	60	3 00		60	3 00		
366	Share capital loan for prospective members of societies			1,300	1.00		1,300	1.00		..
					145 00			225 00		
	New Schemes :									
1.	Diamond Cutting Societies :									
	(a) Block capital / Building, machinery				20 00	2,000		20 00	2,500	Visnagar and other places.
	(b) Working Capital				25 00			25 00		
	Total				45 00			45 00		
2.	Co-operative Ayurvedic Societies									
	(a) Block capital (Land, Building, Machinery)				25.00	200		10 00	300	Ahmedabad and other places.
	(b) Working Capital				10 00			..		
	Total				35 00			10 00		
3.	Co-operative Scooter Factory									
	(a) Block Capital				40 00	200		10 00	300	
	(b) Working Capital				20 00			20 00		
					60 00			30 00		
	Total, F. Cottage Industries				283 00	4,000		310 00	5,000	
	Total, A to F (State Plan Schemes)				452.60			570 20		
	Centrally sponsored schemes : Rural Industries Projects	No	2	2	25.80	500	2	51.0	650	Kutch and Panchmahals dist...
	Grand Total, State Plan Schemes and Centrally Sponsored Schemes				478.40			621.20		

APPENDIX H

POTENTIAL OF EMPLOYMENT IN "KHADI AND VILLAGE INDUSTRIES" AS PER STATE KHADI AND VILLAGE INDUSTRIES BOARD

Sr. No.	Name of Industry	Full employment	Part time employment
1	Cottage Pottery Industry	9,000	4,000
2	Neera Palmgur	4,800	
3	Fruit Processing	296	..
4	Ghani oil	6,000	..
5	Handpounding of rice	1,000	..
6	Gur-Khandsari	14,720	..
7	Gas Plant	50	
8	Cottage Soap Industry	430	110
9	Lime	410	135
10	Hand-made Paper	800	..
11	Gramodyoga Depots	900	
12	Black-smithy and Carpentry	2,550	1,450
13	Aluminium Utensils	135	270
14	Cottage Match Industry	120	1,200
15	Cottage Leather Industry	9,000	..
	Total ..	50,211	7,165

		Employment Potential (Full)	
1.	Plan proposed by the State Khadi Board of Rs. 2.15 crores for Fifth Plan.	50,211	Village Industries, Khadi Industry.
2.	Employment potential for Fifth Plan according to provision of Rs. 47 lakhs proposed.	12,000 +3,000	Village Industries for Khadi Industry estimated.
	Total ..	15,000	
3.	Employment potential for Sixth Plan according to provision of Rs. 94 lakhs proposed.	24,000 6,000	Village Industries Khadi Industry estimated.
	Total ..	30,000	

Report of the Working Group on Industry, Power and Minerals

Part - II

Power

CHAPTER I

PROGRESS DURING 1960-70: A RESUME

1.1 In May 1960, in Gujarat the total generating capacity was of the order of 315 MW from two major and five small steam power stations and 53 diesel power houses of various sizes located at different places in the State. Out of this, the capacity of the power plant operated by the Gujarat Electicity Board was only 145 MW and the balance used to be fed into the grid by private licensees. Gujarat Electricity Board used to distribute power to a limited area around the power stations through transmission lines of various voltages, 66 kv being the highest in the system. Besides, the Board was purchasing about 27 MW in bulk from the Ahmedabad Electricity Company and distributing it in North Gujarat region through a 66 kv system. To meet the increasing demand of power in the State, additional capacity to the extent of 342.5 MW was installed during the Third Five Year Plan. With this addition, the total generating capacity in the State by the end of the Third Five Year Plan rose to 657.5 MW. The power generated from these plants was distributed over high voltage transmission lines including 132 kv. A free flow of power to various regions of the State excepting Kutch, which was still lying outside the system, was ensured through an inter-connected grid system developed during the Thrid Five Year Plan.

1.2 On the basis of the outlay for power generation, a net installed capacity of 874 MW consisting of Dhuvaran Extension Project (280), Ukai Hydro-Project (300), Ukai Thermal Station (240), and Gas Turbines (54), will be added during the Fourth Five Year Plan period. It is thus estimated that the net installed capacity in the system will stand at around 1607 MW by the end of the Fourth Plan, allowing for retirement of 75 MW of old and obsolete sets. The details of the break-up are at Appendix 'A'.

1.3 In 1965, Gujarat Electricity Board took an important step in removing the disparity in the rate structures of different regions in the State and introduced a uniform tariff system which was extended even to Kandla Thermal Station region, although it was not integrated with the Dhuvaran grid. Gujarat is one of the few States with a single grid and a common tariff.

1.4 The number of high tension consumers served by the Board increased from 56 in 1960-61 to 356 in 1970-71. The number of L. T. industrial consumers now stands at 31,656. Similarly, the number of sub-stations has increased from 42 in 1960-61 to 134 in 1970-71. In order to transmit the power generated, steps for the installation of adequate transmission and distribution network have been taken during the Fourth Plan. The progress of erection of transmission lines and the establishment of sub-stations over the last eleven years is indicated in the following table :—

Voltage	Length of line in circuit-kilometres as on		Number of sub-stations as on	
	31st March 1960	31st March 1971	31st March 1960	31st March 1971
220 kv	..	810	..	4
132 kv	..	2,168	..	16
66 kv . ..	567	3,247	12	56
33 kv	567	3,036	30	58
22 kv . ..	1,208	5,630	..	..
11 kv	1,812	18,954	..	..

Gujarat has thus made impressive progress in the field of power development over the last decade. The figures in Appendix "I" testify to the achievements made so far.

1.5 One of the major purposes of formulating a long-term Perspective Plan is to quantify the nature and magnitude of the tasks implied in achieving the specified objectives. Such a quantification is essential to reach decisions, particularly so that preparatory actions can be taken in time, which is so vital in this area where long years of preparation are needed before desired results can be achieved. Another purpose is to evaluate the potential of development and the nature of challenges to be faced in realising it. An attempt to formulate a power plan for the decade 1974-84 has, therefore, been made so as to enable advance planning and timely decisions so necessary for the power generation projects which have long gestation periods (about 5 to 8 years).The experience in the past has amply demonstrated the need for thorough field investigations and advance planning for the indigenous manufacture of the plant and equipment as well as provision of necessary construction equipment and materials. Without this, it would not be possible to achieve higher targets of power generation required for stimulating the economic growth of both industry and agriculture. Unless advance action is initiated in respect of the implementation of power projects, it will not be possible to commission them according to the needs of the period. An attempt has therefore been made to prepare a Perspective Plan for the next decade.

CHAPTER II

POWER PLAN FOR THE DECADE (1974-84)

2.1 Introduction

Electric power is one of the basic and key infra-structures in a growing economy. It occupies a most distinct role in shaping the nation's economic life through its use in various vital segments such as industry, agriculture, mines, etc. It is electrical energy which will determine in more than one way India's rise from an impoverished bullock-cart economy to a stage of self-reliant and self-sustaining development. As a matter of fact, the per capita consumption of electricity is now regarded as one of the most trusted indices of the standard of living and provides a positive indication as to the rate of addition of power generation capacities which should be maintained to accelerate and support specific rates of economic growth. The per capita use of electricity in Gujarat by the end of 1970-71 stands at around 130 kWh based on the installed capacity of 862 MW. This rate of consumption compares very unfavourably with the levels of consumption in advanced countries such as USA (7,013), UK(3,703), USSR (2,628) France (2,403) and Yugoslavia (1,006). Even though such high level of consumption is difficult to reach in the immediate future on account of limited resources available, the aim to reach at least a level of 500 kWh per capita in the course of developmental planning is considered to be the barest minimum needed for attaining a reasonable standard of living. The Perspective Plan for power development for the next decade, therefore, envisages an intensive generation programme to raise the per capita use of electricity to the level of 250 to 300 kWh.

2.2 Load Projection

2.2.1 The demand for electrical energy arises as a direct consequence of growth in the various sectors of economy and also due to factors like growth in population, substitution of electricity for other forms of energy, etc. Projection of demand for power is a complex task, involving consideration of a number of variable and uncertain factors, difficult to predict in precise terms. However, for obtaining a fair indication as to the likely load development in the future, one has to depend on the past growth rates in various sectors as well as the expected potential so far as it can be estimated.

2.2.2. The demand for power in Gujarat State has been steadily increasing on account of progressive industrialisation as well as rapid spread of the use of electrical energy for bringing about green revolution and for intensified rural electrification programme. The demand for power in the State has been going up at the rate of about 150 MW per year. The rate of growth is expected to go up to about 250MW every year during the Fifth Plan period. Though there has been augmentation in installed generating capacity in successive years (about 315 MW in May, 1960 to 862 MW during 1970-71), the demand has been out-stripping the generating capacity in the State. Projections made for demand for power in Gujarat during the past Plans have been proved fairly accurate and the difference between the projected demand and the actual realisation has been very marginal. Therefore, assessment of power demand during the next decade has been worked out on the basis of the same principles.

2.2 3 As stated earlier, one of the major considerations for projecting the power requirement is the rate of growth of various categories of industries that are likely to come up during the next decade. Broadly speaking, it is visualised that the industrial base during the Fifth Plan will be chemical industry oriented. With the establishment of the Petro-chemical Complex, large quantities of aromatics and olefins would be available as feed stc [illegible] sectors. These products have tremendous utilisation potential [illegible] into caprolactum, polyethylene, high polymers, plastics, [illegible] products and it is therefore but natural that there will be a trem

tries during the Fifth Plan period. Similarly, accelerated rate of growth of engineering industires besides power-intensive industries like aluminium, fertiliser, etc. during the Fifth and Sixth Plans is anticipated. Appendix 'B' indicates the rates of growth of different types of load that are likely to be developed over the next decade in the State.

2.2.4 The generation schemes required to meet the load growth will have to be adequate not only to take care of the load itself but also to cater for items like auxiliaries, scheduled maintenance, etc. Taking all these factors into consideration, the generation schemes have to be installed with adequate gross margin over and above the requirement to meet the load demand. Experience gained in India as well as in advanced countries suggests that such gross margin should be kept at around 25 per cent to 40 per cent depending upon the extent of the system network and inter-connection. Gujarat has already established a wide and extensive network and has planned to set up a few generating stations to be commissioned during the Fourth Five Year Plan. For a network of this magnitude, a gross margin of 30 percent to 35 per cent is considered adequate to meet the exigencies of the system.

2.2.5 Load growth by the end of the Fourth Five Year Plan in Gujarat has been estimated to be of the order of 1234 MW relying on the laid down principles for projecting the load potential. With a gross margin of 30 per cent, at least an installed capacity of 1600 MW will be required to meet this anticipated and projected load of 1234 MW. Within the outlay for the continuing generation projects and new schemes, the State would be able to add 820 MW augmenting the total generating capacity to 1607 MW by 1973-74 allowing for retirement of old and obsolete sets of 75 MW capacity. In Appendix 'A' additional benefits that are likely to be derived from the different generating schemes during the Fourth Five Year Plan have been indicated.

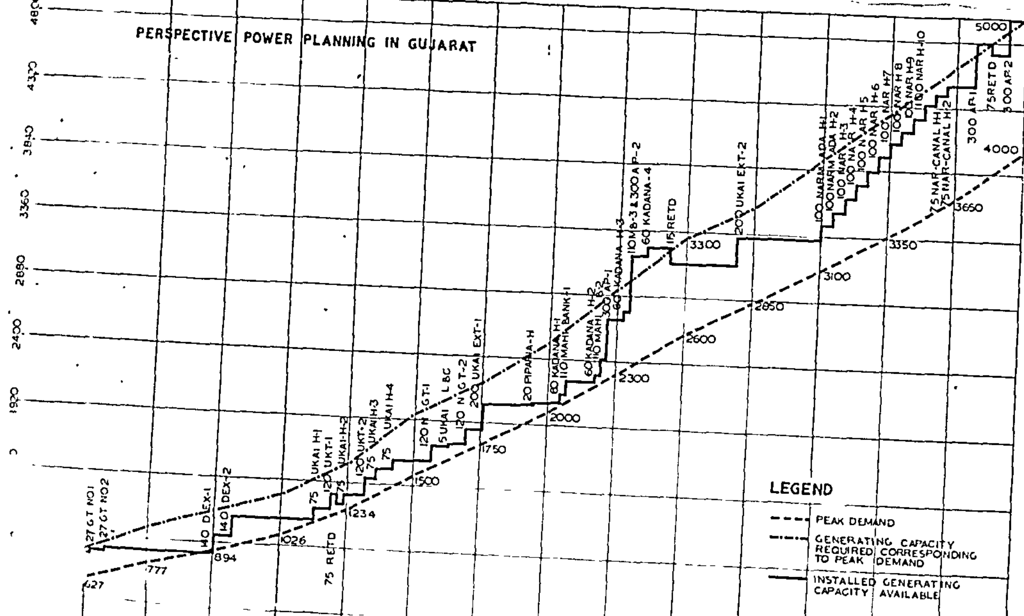
2.2.6 Since the economy of the State is in a developing stage, the rate of growth of the load has been estimated at around 15 per cent during the Fourth Five Year Plan and the demand can be expected to continue to grow at the same rate during the Fifth Five Year Plan period. Projections of load growth during the Sixth Plan have been made on the basis of certain assumptions because the pace of development of industrial and agricultural sectors cannot be projected in a reliable manner. As economy picks up, a point of saturation is expected to be reached in certain sectors and infra-structural bottlenecks may crop up with consequent fall in the demand for power and it will not be realistic to expect that the demand will continue to grow at the same rate during the Sixth Five Year Plan also. Therefore, the annual rate of growth is projected at around 9 per cent during the Sixth Plan. Based on this, the load demand anticipated and the installed capacity required in different Plan periods in Gujarat will be as under :—

Plan	Year ending	Expected demand (MW)	Required installed capacity (MW)
Fourth	1973-74	1,234	1,607
Fifth	1978-79	2,600	3,300
Sixth	1983-84	4,000	5,000

The graph of " Perspective Power Planning in Gujarat " indicates the load growth and the generating capacity required from year to year up to the end of the Sixth Plan.

2.3 Rural Electrification

2.3.1 The importance of rural electrification cannot be over emphasised in the context of over-all rural development in the country. It is, in fact, the key factor in the socio-economic



PERSPECTIVE POWER PLANNING IN GUJARAT
1920
2400
2880
3360
3840
4320
27 GT NO1
27 GT NO2
140 DEX-1
140 DEX-2
75 UKAI H-1
120 UKT-1
75 RETD
75 UKAI-H-2
120 UKT-2
75 UKAI H-3
75 UKAI H-4
120 N GT-1
5 UKAI L BC
120 N GT-2
200 UKAI EXT-1
20 PIPAVA-H
60 KADANA H-1
110 MAHI BANK-1
60 KADANA H-2
110 MAHI B-2
300 AP-1
60 KADANA H-3
110 MB-3 & 300 AP-2
60 KADANA-4
115 RETD
200 UKAI EXT-2
100 NARMADA H-1
100 NARMADA H-2
100 NAR H-3
100 NAR H-4
100 NAR H5
100 NAR H-6
100 NAR H-7
100 NAR H 8
100 NAR H-9
100 NAR H-10
75 NAR-CANAL H-1
75 NAR-CANAL H-2
300 AR-1
75 RETD
300 AR 2
427
777
894
1026
1234
1500
1750
2000
2300
2600
2850
3100
3300
3350
3650
4000
5000
LEGEND
PEAK DEMAND
GENERATING CAPACITY REQUIRED CORRESPONDING TO PEAK DEMAND
INSTALLED GENERATING CAPACITY AVAILABLE

tries during the Fifth Plan period. Similarly, accelerated rate of growth of engineering industires besides power-intensive industries like aluminium, fertiliser, etc. during the Fifth and Sixth Plans is anticipated. Appendix 'B' indicates the rates of growth of different types of load that are likely to be developed over the next decade in the State.

2.2.4 The generation schemes required to meet the load growth will have to be adequate not only to take care of the load itself but also to cater for items like auxiliaries, scheduled maintenance, etc. Taking all these factors into consideration, the generation schemes have to be installed with adequate gross margin over and above the requirement to meet the load demand. Experience gained in India as well as in advanced countries suggests that such gross margin should be kept at around 25 per cent to 40 per cent depending upon the extent of the system network and inter-connection. Gujarat has already established a wide and extensive network and has planned to set up a few generating stations to be commissioned during the Fourth Five Year Plan. For a network of this magnitude, a gross margin of 30 percent to 35 per cent is considered adequate to meet the exigencies of the system.

2.2.5 Load growth by the end of the Fourth Five Year Plan in Gujarat has been estimated to be of the order of 1234 MW relying on the laid down principles for projecting the load potential. With a gross margin of 30 per cent, at least an installed capacity of 1600 MW will be required to meet this anticipated and projected load of 1234 MW. Within the outlay for the continuing generation projects and new schemes, the State would be able to add 820 MW augmenting the total generating capacity to 1607 MW by 1973-74 allowing for retirement of old and obsolete sets of 75 MW capacity. In Appendix 'A' additional benefits that are likely to be derived from the different generating schemes during the Fourth Five Year Plan have been indicated.

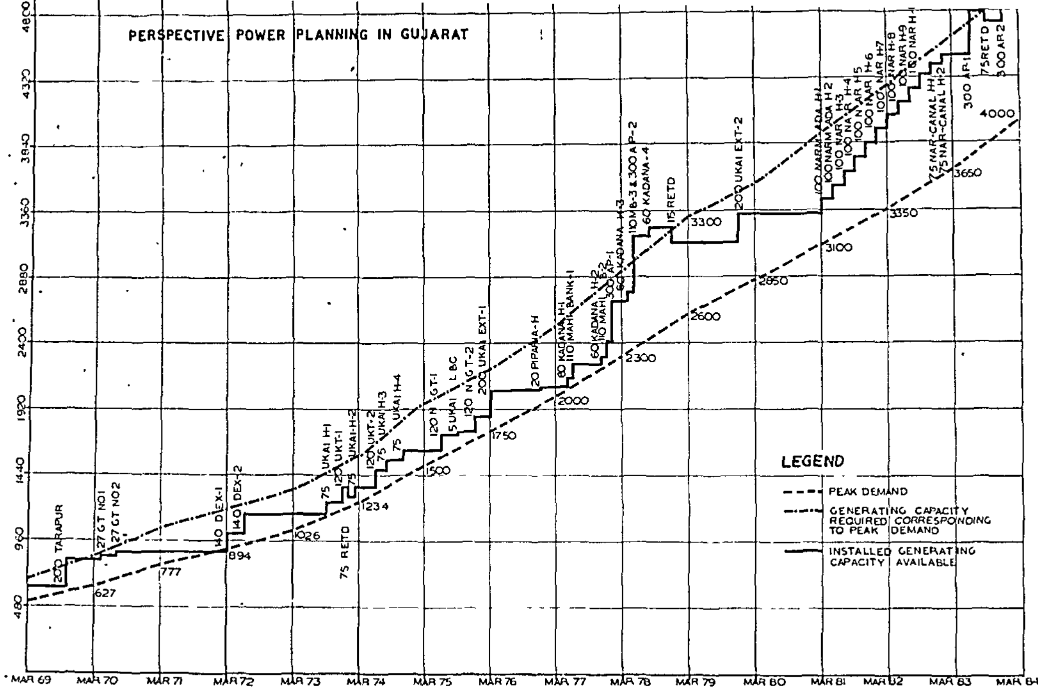
2.2.6 Since the economy of the State is in a developing stage, the rate of growth of the load has been estimated at around 15 per cent during the Fourth Five Year Plan and the demand can be expected to continue to grow at the same rate during the Fifth Five Year Plan period. Projections of load growth during the Sixth Plan have been made on the basis of certain assumptions because the pace of development of industrial and agricultural sectors cannot be projected in a reliable manner. As economy picks up, a point of saturation is expected to be reached in certain sectors and infra-structural bottlenecks may crop up with consequent fall in the demand for power and it will not be realistic to expect that the demand will continue to grow at the same rate during the Sixth Five Year Plan also. Therefore, the annual rate of growth is projected at around 9 per cent during the Sixth Plan. Based on this, the load demand anticipated and the installed capacity required in different Plan periods in Gujarat will be as under :—

Plan	Year ending	Expected demand (MW)	Required installed capacity (MW)
Fourth	1973-74	1,234	1,607
Fifth	1978-79	2,600	3,300
Sixth	1983-84	4,000	5,000

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PERSPECTIVE POWER PLANNING IN GUJARAT
480
960
1440
1920
2400
2880
3360
3840
4320
4800
MAR 69
MAR 70
MAR 71
MAR 72
MAR 73
MAR 74
MAR 75
MAR 76
MAR 77
MAR 78
MAR 79
MAR 80
MAR 81
MAR 82
MAR 83
MAR 84
200 TARAPUR
27 GT NO1
27 GT NO2
627
777
140 DEX-1
140 DEX-2
894
1026
75 UKAI H-1
120 UKT-1
75 RETD
75 UKAI-H-2
1234
120 UKT-2
75 UKAI H-3
75 UKAI H-4
1500
120 N GT-1
5 UKAI L BC
120 N GT-2
200 UKAI EXT-1
1750
20 PIPARIA-H
60 KADANA H-1
110 MAHI BANK-1
2000
60 KADANA H-2
110 MAHI B-2
300 AP-1
60 KADANA H-3
110 MB-3 & 300 AP-2
60 KADANA-4
2300
115 RETD
2600
3300
200 UKAI EXT-2
2850
100 NARMADA H1
100 NARMADA H2
100 NAR H-3
100 NAR H-4
100 NAR H5
100 NAR H-6
100 NAR H-7
100 NAR H-8
100 NAR H-9
100 NAR H-10
3100
3350
75 NAR-CANAL H1
75 NAR-CANAL H-2
3650
300 AP-1
4000
75 RETD
300 AP 2
LEGEND
PEAK DEMAND
GENERATING CAPACITY REQUIRED CORRESPONDING TO PEAK DEMAND
INSTALLED GENERATING CAPACITY AVAILABLE

transformation in the rural areas. The rural electrification programme is, therefore, rightly receiving the special attention of the State Government as well as the Gujarat Electricity Board. The State Government has laid special emphasis on the energisation of irrigation pumpsets. The agriculture of the State depends upon the vagaries of the monsoon and the steady agricultural production can only be ensured through irrigation and so long as adequate canal irrigation facilities do not develop, mainstay of the agriculture sector will remain lift irrigation. The programme for energisation of irrigation pumpsets gathered momentum only from 1966 onwards. During the last 15 years of the first three Plans, Gujarat Electricity Board could energise only about 15,045 irrigation pumpsets out of the total of 5,50,000 in the State. During the last 5 years as many as 51,000 pumpsets have been energised-an average of nearly 10,000 per year as against the average of 1,000 in the previous 15 years. But, one has to remember that there are still 5 lakh pumpsets which are yet to be energised and nearly 20,000 pumpsets are added to this number every year. With the resources available, Gujarat Electricity Board cannot, however, *undertake a programme of energising more than 20,000 irrigation pumpsets every year* during the next decade. So far (on 31st August 1971) only 69,072 irrigation pumpsets have been energised besides nearly 909 tubewells in the State.

2.3.2 As stated earlier, *emphasis has been on electrifying villages only for agricultural purposes.* This has, in a way, denied the rural population of the use of power for domestic and other purposes, so necessary for improving the standard of living. According to 1961 census, there are about 18,584 villages in the State. This number includes sparsely populated and widely isolated villages. Of these, about 3,000 to 4,000 villages fall under the category of uneconomical areas where the need for electrification, except perhaps for lighting, has not been felt. So far (on 31st August 1971) 4,235 villages have been electrified and this figure would reach 5,407 by the end of the Fourth Plan. The Perspective Plan contemplates to electrify as many as 8,925 villages over the next decade raising the total number of electrified villages to 14,332 by the end of the Sixth Five Year Plan. The statistical details regarding village electrification are at Appendix 'C'.

2 3.3 Gujarat is lagging behind in the matter of rural electrification. Haryana has achieved cent percent rural electrification, followed by Tamil Nadu, Kerala, Mysore and Andhra Pradesh. With a view to catching up with the rest of the country, a programme of electrifying *1,500 villages for all purposes during the Gandhi Centenary year was undertaken by the* Board. Out of these, State Government have decided to electrify 200 villages in adivasi areas without any financial contribution from the people. The Board has now decided to extend the scheme up to 30th September, 1972 and also to increase the target to 2,000 villages. *It will thus be obvious that much remains to be done in the field of rural* electrification in as much as over 14,000 villages and 5 lakh irrigation pumpsets are yet to be electrified.

2.3.4 The main bottleneck in undertaking an ambitious programme of rural electrification is the funds required for the purpose. Earmarked central assistance used to be provided by the Government of India for rural electrification schemes till 1968-69. Since the inception of the Fourth Plan, no central assistance is being provided for rural electrification programmes and the expenditure on such schemes is borne by the State Government. If Gujarat Electricity Board have to energise the remaining 5 lakh irrigation pumpsets, at least a sum of Rs. 250 crores is required besides the staggering amount required for generating adequate quantum of power to feed these pumps. Assuming the average cost of providing distribution lines and sub-station equipments at Rs. 30,000 per village and if all the villages in the State are to be electrified, capital outlay involved in the distribution lines alone would exceed Rs. 42 crores. Further, in comparison with the large urban areas, rural areas lack what is described as load density. Most of the villages *in the State are comparatively far away from the developed power sources. Hence, the capital cost as well as operation and maintenance charges are much higher.* Also the rural loads are scattered and the demand of consumers is small owing to the low standard of living. Finance is the main bottleneck in the way of rapid progress in the field of rural electrification programme. A sum *of about Rs. 42 crores has been spent for electrification programme during the period 1962-71.* The Perspective Plan contemplates to spend about Rs. 141 crores on rural electrification programmes over the next decade (1974-84).

Pattern of Consumption

2.4 The per capita consumption of electricity is 130 kWh in the State. As in other States, industry would continue to be the largest consumer of electricity (750 MW by 1973-74). This share is expected to go up to 2,750 MW by 1983-84. There has, however, been a significant increase in power consumption by agriculture during the past five years. There is a good potential in the State for the development of lift irrigation specially in the alluvial tracts. The irrigation load is likely to be increased to 900 MW on account of the green revolution by the end of the Sixth Plan.

CHAPTER III

POWER GENERATION PROGRAMME FOR 1974-84

3.1.1 All the available generation potential in the State that could be economically harnessed should be taken into account while formulating a plan for the future. Hydro resources which constitute the most economic source of electricity generation naturally claim the first choice. Moreover, the hydro-projects also afford the highest employment potential. The capital outlay on hydro-power stations is comparable to that on thermal power stations. The cost of generation from hydro-stations is significantly lower than that from other sources. Gujarat's main river systems are Narmada, Tapti and Mahi, which are important from the point of view of hydro-electric development. The hydro-electric potential of the Tapti is being harnessed by installing a hydro-project at Ukai. The Ukai multi-purpose hydro-electric project is being jointly executed by the Public Works Department of State Government and the Gujarat Electricity Board. The project envisages installation of four sets of 75 MW each. The project is expected to be commissioned during the Fourth Plan period. This river cannot be exploited further for any generation scheme in the future.

3.1.2 Narmada, the biggest river in Gujarat, has a hydro-potential of about 2,000 MW but on account of inter-State dispute, the realisation of power from this source may only materialise in the Sixth Plan. There are no significant coal reserves in the State. The oil and gas resources so far developed are fully committed and the scope for future power generation from these sources being limited, it would be necessary for Gujarat to resort to either thermal generation by import of coal from long distances or nuclear generation, depending upon their relative economics. If offshore drilling becomes successful, the existing coal-based thermal stations can be converted into oil and/or gas firing for more economical generation. But this possibility is uncertain at present.

Hydro-electric Resources

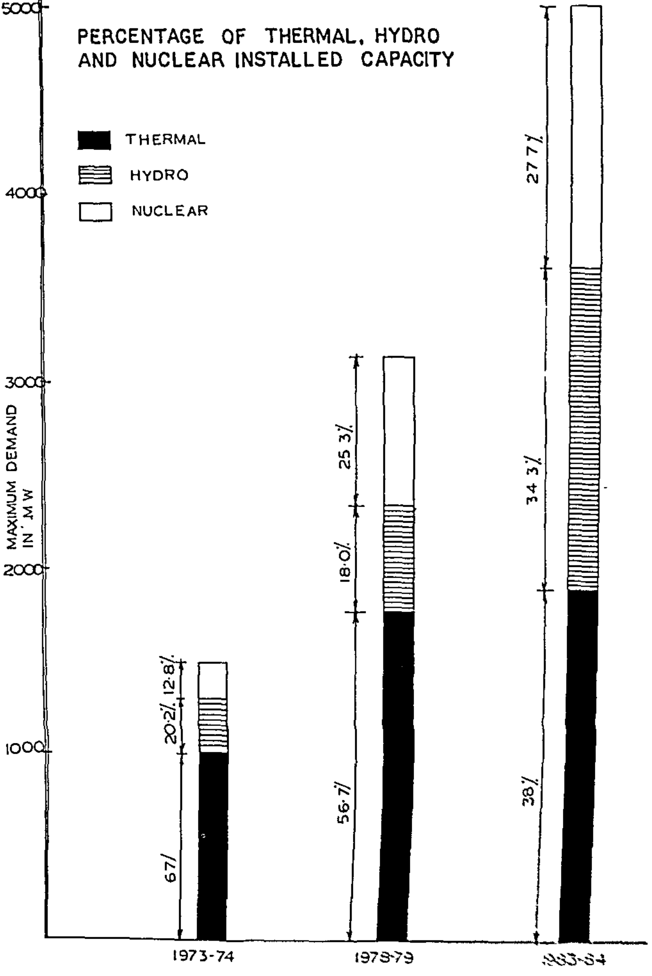
3.2 The hydro potential of the Narmada could not be harnessed so far on account of prolonged inter-State dispute on sharing of the waters. It would, however, be vital to exploit this source fully in the years to come. The anticipated level of generation from this source is of the order of 2,000 MW. It has been assumed that of this, 1,150 MW will be available to Gujarat in the Sixth Plan and not only 150 MW as has been contemplated by the Government of India in their decade plan for 1971-81. Generation of 1150 MW will entail an approximate outlay of 345 crores of rupees. Early exploitation of this source is vital for Gujarat and should not in any case be delayed beyond this decade.

Kadana Hydro-Project

3.3 The Kadana hydro-project envisages installation of reversible pump turbine sets of 4 units of 60 MW each to cater to a maximum demand of 200 MW during peak periods. The project is estimated to cost about Rs. 72 crores and it is likely to be commissioned during the Fifth Plan period.

Piparia Hydro-Project

3.4 Surplus water available at about 25 kms. downstream of Kakrapar weir near village Piparia is proposed to be utilised for generation of power. Generation of power from this station would be seasonal depending upon the surplus water available for generation at Piparia. The project envisages the installation of a set of 20 MW at an estimated cost of Rs. 6 crores. The project is likely to be commissioned during the Fifth Plan period.



PERCENTAGE OF THERMAL, HYDRO
AND NUCLEAR INSTALLED CAPACITY
THERMAL
HYDRO
NUCLEAR
MAXIMUM DEMAND
IN MW
5000
4000
3000
2000
1000
67%
20·2%
12·8%
56·7%
18·0%
25 3%
38%
34 3%
27 7%
1973-74
1978-79

Thermal Station Based on Lignite

3.10 Deposits of lignite have been located in Kutch and the East German experts have recommended the exploitation of Kutch lignite for power generation. It will not, however, be possible to take a firm decision in principle to set up a power station based on these deposits until we receive the detailed techno-economic feasibility report from the Central Fuel Research Institute, to whom this work has been entrusted. If sufficient quantity of lignite of the right quality at economical rates and if adequate quantity of water for cooling and other purposes are made available, a thermal plant could be set up during the next decade based on this fuel.

Power Generation Programme (Ahmedabad Electricity Co.)

3.11 While working out the installed capacity required for meeting the power demand, the retirement of old and obsolete units which have served their useful life is taken into account. According to this principle, the Ahmedabad Electricity Co. has planned to add a unit of 110 MW thermal generating set to their system while allowing for retirement of old and obsolete sets of the capacity of 67.5 MW, 45 MW and 45 MW respectively at the end of the Fourth, Fifth and Sixth Five Year Plans. The balance requirement of the grid will be provided by the Gujarat Electricity Board. The necessary provision for this contingency has been made in the power generation and transmission schemes proposed in the Perspective Plan. It may, however, be added that the actual physical retirement of the old and uneconomic sets will be undertaken depending upon the system exigencies.

Atomic Power Station

3.12.1 As mentioned earlier, the demand for power in Gujarat has been steadily increasing on account of accelerated rate of industrialisation as well as rapid stride in the field of agricultural production and rural electrification. As stated earlier, in order to meet the demand to the extent of 2600 MW by the end of Fifth Plan,the total installed generating capacity after allowing for standby, auxiliaries, etc. will have to be of the the order of 3300 MW. It is, therefore, contemplated to execute the following thermal schemes during the Fifth Plan period.—

(1) North Gujarat Thermal Station (240 MW)
(2) Ukai Extension Scheme (200 MW)
(3) Thermal Station on the bank of Mahi (330 MW)

All these schemes together will add 770 MW to the installed generating capacity in the State during the Fifth Plan. As Gujarat has no significant coal reserves, the requirement of 6,500 tonnes of *coal per day for these projects will have to be imported from other States. Besides this, the* coal requirement of the Ukai thermal station is of the order of two train loads per day. Thus the total tonnage of coal to be transported will be 8 to 10 train loads per day. Haulage of coal to this extent will be a difficult proposition as rolling stock and track facilities may present a major bottleneck in course of time. Gujarat grid is entirely fed by thermal power stations at present. In a thermal station, the cost of power generation is governed chiefly by the cost at which the fuel is made available. Collieries being situated hundreds of miles away from the power stations, the cost of haulage of coal is indeed prohibitive. For this reason, the cost of power generation in Gujarat compares unfavourably with that in places like Bombay, Madras, Punjab, etc. Cost of generation of power in different States is as under :—

Name of the State	Cost in paise per kWh
Tata/Koyana in Maharashtra ..	2.50
Punjab	2.90
Maharashtra	3.00
Bihar	4.00
West Bengal	4.00
Madras	4 00
Mysore	4.30
Madhya Pradesh	4.30
Gujarat Electricity Board .. .. (for new thermal stations like Bhat)	7.60

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Punjab	2.90
Maharashtra	3.00
Bihar	4.00
West Bengal	4.00
Madras	4.00
Mysore	4.30
Madhya Pradesh	4.30
Gujarat Electricity Board (for new thermal stations like Bhat)	7.00

3.12.2 The cost of coal is going up day by day. The cost works out to Rs. 60 to Rs. 70 per tonne at the power stations and the cost of generation varies from 7.5 to 8 paise per unit. At present about 40 per cent of Gujarat coal requirements are drawn from West Bengal-Bihar belt (a distance of about 2,000 kms) and 60 per cent from M. P. (a distance of about 1,000 kms). The above cost analysis distinctly highlights that it will not be economical to plan to meet the future power requirements from thermal stations based on coal which is to be transported over a long distance. Gas and oil resources so far developed in the State are fully committed and the scope for planning additional thermal plants based on these resources is extremely limited.

3.12.3 The hydro potential which is capable of being exploited is being harnessed. It is proposed to exploit the hydro resources of the Tapti (Ukai Hydro 300 MW) and the Mahi (Kadana Hydro 240 MW) rivers during the subsequent Plans. It is also being assumed that Gujarat will be able to get a share of 1150 MW at least in the Sixth Plan period from the Narmada project.

3.12.4 The Atomic Energy Commission has also accepted in principle that nuclear energy is a necessity in the areas such as Gujarat which are far away from coal fields and starved of hydro-electric resources and also which have very little untapped conventional resources left for future development; and that the need for establishing an Atomic Plant in the Western Region during the early part of the Fifth Plan is also accepted by the Central Water and Power Commission. The Government of India, Ministry of Irrigation and Power has also proposed for an Atomic Power Station in Western Region in their decade plan over and above the extension to the Tarapore Power Station. Rich and abundant deposits of bauxite ore in the Saurashtra area are one of the many built-in advantages of setting up power intensive industries like aluminium. The establishment of aluminium-alumina project is already at an advanced stage of consideration. Besides, this region offers built-in port facilities-there is a major port at Kandla and Okha would make an excellent deep sea port. Undoubtedly, good port facilities are critical for setting up of a nuclear plant. The existing power demand and the potential load growth in the next 5 to 10 years specially for chemical, fertilisers, alumina and cement industries is so large that more than 50 per cent of the power generated in the proposed station will be consumed locally and the rest could be transmitted to other parts of Gujarat not far from Saurashtra region. All sources of power generation are located in South Gujarat and there is no large-sized project in West Gujarat or in North Gujarat. This results in lack of balance and heavy losses in transmission. If the requisite investment in the transport system for movement of coal is also taken into consideration, it appears that development of nuclear power in areas which are more than 1,000 kms. away from the coal fields and which also do not have hydro potential would be justified on purely economic grounds alone.

3.12.5 One of the specific requirements of a nuclear station is that it should be base-loaded. This implies an adequate development of load in the system in such a way that the station can run at the base-load and the fluctuations in the demand can be taken care of by other units-hydro and thermal. The annual load factor of Gujarat at present is 62 to 65 per cent and the day load factor is 70 to 75 per cent. With the establishment of petrochemical industries, fertilisers, alumina projects, the load factor of the system will further improve. At present, the night low load is about 40 to 50 per cent of the peak load but with the load growth estimated during the Fifth Five Year Plan, the ratio will progressively increase and there will be no difficulty in running the proposed nuclear station as base-load station. The following factors have a critical bearing on the location of an Atomic station:—

(*a*) Adequate supply of sweet water. ..
(*b*) Rocky foundation .. ..
(*c*) Low density of population in the area.
(*d*) Facilities for transport by sea or land. ..
(*e*) Outside seismic zone. ..
(*f*) Facilities or inter-connecting with the existing transmission and distribution network.

Taking all these factors into consideration, Saurashtra coast offers a probable site for the location of the proposed Atomic Power Station. With the Narmada scheme under dispute and the resources of primary energy in the form of oil and gas being limited and the coal supplies being so distant, there is no alternative but to set up an Atomic Power Station to meet the ever-growing demand for power in the State. It is, therefore, proposed to set up a Nuclear Power Plant of 1200 MW to be spread over the Fifth and Sixth Five Year Plans.

Agro-industrial Complex

3.13.1 The concept of the atomic powered agro-industrial complex envisages generation of power as cheaply as possible and utilising it with the minimum of additional costs for transmission and distribution. The State Government have been communicating with the Government of India with regard to setting up an Agro-industrial Complex pivoted by the Nuclear Power Station for which a project report has already been prepared by the Bhabha Atomic Research Centre.

3.13.2 With the further development of desalination technology and construction of larger size plants, the cost of desalination is likely to go down considerably. It is, therefore, suggested that the proposed Atomic Plant along the Saurashtra coast can be linked with a desalination plant which is of particular relevance in Saurashtra region where water resources both surface and underground are scarce. Prospects of linking it up with the Tata Fertilizers Project which proposes to derive ammonia by interacting nuclear en rgy and sea water also open up a promise of great future for optimal use of this energy in a vital industry.

3.13.3 The short fall in generating capacity is depicted in the graph where generation from year to year is interposed in between demand and generation required

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CHAPTER IV

TRANSMISSION AND DISTRIBUTION NETWORK

4.1.1 In order to ensure free flow of power to the consumers, adequate transmission and distribution network will have to be installed along with the generation scheme. Any imbalance between the generating capacity and transmission and distribution facilities will have a network of crippling effect on the growth of the economy of the State. During the decade plan, a number of generation schemes will be installed, which will add power to the grid in the State considerably. Also, the State contemplates a programme of energising 20,000 irrigation pumpsets every year during the next decade. It is, therefore, necessary to plan for adequate transmission and distribution facilities in the State. The decade Plan provides for establishment of transmission lines of various voltages ranging from 220 kv to 500 kv. In the decade Plan, a provision of Rs. 280 crores has been made for transmission and distribution programmes in order to achieve a balance between the generating capacity and the transmission and distribution facilities. It is observed that for every kW installed, the cost of transmission and distribution will be of the order of 100 to 125 per cent of the cost of generating capacity installed. Therefore, while making financial planning, these aspects have to be taken into consideration and adequate funds made available for undertaking the required transmission and distribution network.

4.1.2 For catering the demand in the State, an extensive interconnected grid system is being developed, which will have to be expanded with the augmentation of installed generation capacity. A large block of power has to be transmitted over a long distance and Gujarat Electricity Board has to plan for super-high tension lines of 400-500 kv during the decade. With the establishment of super-high tension system, it will be possible to transmit the power in a more reliable manner. Appendices ' D ' ' E ' and ' F ' indicate the transmission lines of various voltages that will be established by the end of the Fourth Five Year Plan and those proposed during the Fifth and Sixth Five Year Plans respectively.

Inter-State Links

4.2 Inter-connection between the State grid systems enabling inter-State transfer of power is a significant development in the recent past. New surplus power available in a State can be transmitted to a deficit region. The purpose of inter-State links is to attain the optimum utilisation of power generated in different regions of the country and to assist each other during power emergencies. Gujarat is now connected with Maharashtra through 220 kv Navsari-Tarapur line and the second link of 220 kv between Nasik and Navsari will be installed in the foreseeable future. Similarly, there are plans to inter-connect Madhya Pradesh and Rajasthan with Gujarat. All these inter-State links are centrally sponsored schemes and even though they would not add directly to the generating capacity of a State, they would be very effective, particularly in combating emergencies.

CHAPTER V

FINANCE

5.1 The estimated costs of the power schemes to be executed during the next decade will be around Rs. 1,003 crores. The details are given in Statements I and II. This estimate does not cover the cost for setting up an Atomic Power Station along the Saurashtra coast, to be spread over the Fifth and Sixth Five Year Plans as this station has to be financed and executed by the Central Government. Therefore, the financial requirements indicated are limited to the schemes which are to be undertaken and executed by the Gujarat Electricity Board.

5.2 Statement III gives the break-up of the requirements of the funds on year to year basis of the Fifth and Sixth Five Year Plans respectively. It will be seen therefrom that the total requirements of the funds has been estimated after taking into account the internal resources like depreciation and general reserves. A significant part of the requirement is provided by the State Government by way of capital loan for execution of the power programmes. Besides, the Board will be required to enter into the market to raise public loans. Special loans may also be obtained by the Board from the Life Insurance Corporation to meet a part of the requirements for funds. For financing rural electrification scheme, it will be possible to get a part of the requirement from the Rural Electrification Corporation and Agricultural Finance Corporation, but these funds will be limited to certain selected schemes only. However, the financial position of the Board has become precarious and as a result of the general financial squeeze, prospects of getting funds on a substantial scale from the nationalised banks for financing generation or transmission and distribution schemes have further receded. In view of this position, the Central Government as well as the State Government will have to extend financial assistance to the Board in a more generous manner during the next decade.

CHAPTER VI

EMPLOYMENT OPPORTUNITIES AND PERSONNEL TRAINING

6.1 The schemes envisaged in the Decade Plan afford adequate employment potential. In order to derive benefits from the projects proposed in the Perspective Plan, adequate manpower resources will be required during the period. The Gujarat electricity Board would be requiring manpower of various categories such as persons having specialised knowledge, qualified engineers, technicians, skilled labours. The requirement of such personnel is as follows:—

Category		Fourth Plan	Fifth Plan	Sixth Plan
1. Specialists ..	..	10	20	30
2. Qualified Engineers	..	200	400	500
3. Technicians ..	..	400	800	1,000
4. Skilled Labour ..	..	1,800	2,500	3,000
5. Unskilled Labour	..	3,000	4,500	5,000
6. Administrative Staff	..	1,500	1,800	2,000
	Total ..	6,910	10,020	11,530
	Say.	7,000	10,000	11,500

Personnel Training Programme

6.2 As for the programme for meeting the needs of the personnel, the Board as per its existing policy would recruit various categories of staff from time to time at the junior cadre level. The higher responsible posts are filled in either by departmental promotions or by recruiting specially trained and experienced personnel from outside depending upon the nature of requirement. The Board will, however, send out certain number of personnel for training in the works of suppliers of the plant and equipment to ensure availability of properly trained personnel. The Gujarat Electricity Board has estimated the requirement of engineering personnel for job operation in the various power schemes and an adequate number of personnel are being suitably trained for the jobs and these personnel might eventually be absorbed in the operation and maintenance of various projects. The Board has already a programme of providing training to deputy engineers for a period of 6 months at Dhuvaran Power Station for generation, transmission and distribution works. This will be continued in the subsequent Plans also. Thus recruits will have to undergo practical training in the field in order to get themselves acquainted with the task which they have to perform in course of their assignment with the Gujarat Electricity Board.

Materials and Equipment Requirement

6.3 Various items of power generating equipment will be required by the Board to execute the generating programme proposed in the Perspective Plan. In order to secure maximum utilization of the generating capacity, an ambitious programme for transmission and distribution network will have to be undertaken. Besides, rural electrification programme will also receive increasing attention in the subsequent Plans. For carrying out all these programmes, considerable quantity of equipment and materials will have to be obtained by the Board. Most of the power plant and switch-gear equipment are generally obtained indigenously from the public sector undertakings like Heavy Electricals and Bharat Heavy Electricals, etc. A list of important items that would be required by the Board during the Fifth and Sixth Five Year Plans are indicated at Appendix H.

CHAPTER VII

CONCLUSION

7.1 Appendix G gives a resume of the various power plans for meeting the needs during the Fourth, Fifth and Sixth Five Year Plan periods. Considering the development needs of the State in the next decade in respect of power, a total financial outlay needed for all the schemes proposed in the decade plan will be of the order of Rs. 1,003 crores (excluding the outlay for Atomic Power Station) as summarised below :—

(Rs. in crores)

	Fifth Plan 1974-79	Sixth Plan 1979-84	Total
Generation Schemes ..	215	385	600
Transmission and Distribution Schemes.	130	130	260
Rural Electrification Schemes ..	66	75.5	141 5
Miscellaneous	1	0.5	1 5
	412	591	1,003

7.2 The importance of meeting the power needs of the State, as proposed, needs no emphasis for the reason that any shortfall in the programme will have a network of strangulating effect on the economy of the State.

STATEMENT I

Finance required during Fifth Five Year Plan

Sr. No.	Scheme	Particulars	Outlay required (Rs. in crores)	Remarks
1	2	3	4	5
I	Generation Schemes :	Installed Generating Capacity		
	(i) North Gujarat Thermal ..	2×120 MW sets	30	Estimated cost is Rs. 42 crores. Of this, Rs. 12 crores will be spent in Fourth Plan.
	(ii) Ukai Thermal Extension ..	1×200 MW set	30	
	(iii) Mahi Bank Thermal ..	3×110 MW sets	66	
	(iv) Kadana Hydro	4×60 MW sets	72	Pumped storage scheme.
	(v) Piparia Hydro	1×20 MW set	6	
	(vi) Ukai Left Bank Canal ..	2×3 MW sets	1	
	(vii) Atomic Power Station ..	2×300 MW sets	..	This is a Central Government scheme to be financed and executed by Government of India.
		Sub-total ..	205	
II	Transmission and Distribution schemes including normal development.	Erection of transmission lines and sub-stations		
	Transmission and Distribution Schemes ..	..	140	
III	Rural Electrification ..	Electrification of 4000 villages, 1,00,000 irrigation pumpsets and 500 tubewells.	66	
IV	Acquisition of licenses	..	1	
		Total ..	412	

STATEMENT II

Finance required during Sixth Five Year Plan

Sr. No.	Scheme	Particulars	Outlay required (Rs. in crores)	Remarks
1	Generation Schemes :	Installed Generating Capacity		
	(i) Ukai Thermal Extension	1×200 MW set	30	
	(ii) Narmada Hydro Project	10×100 MW sets +2×75 MW sets	345	
	(iii) Atomic Power Station	3×200 MW sets		This is a Central Government scheme to be financed and executed by Government of India.
		Sub-total	375	
2	Transmission and Distribution schemes including normal development. Transmission and Distribution Schemes	Erection of transmission and distribution lines and sub-stations.	140	
3	Rural Electrification	Electrification of about 5,000 villages, 1,00,000 irrigation pumpsets and 500 tubewells.	75 5	
4	Acquisition of licenses		0 5	
		Total	591	

STATEMENT III

Annual Outlay and Financing Requirements (excluding Nuclear Power Station and Inter-State Links) during Fifth and Sixth Plans

(Rs. in Crores)

Details	Fifth Five Year Plan						Sixth Five Year Plan					
	1974-75	1975-76	1976-77	1977-78	1978-79	Total	1979-80	1980-81	1981-82	1982-83	1983-84	Total
A. Outlay :												
1. Generation Schemes	55	55	55	35	15	215	75	75	100	100	35	385
2. Transmission and Distribution schemes	20	30	30	25	25	130	25	25	30	30	20	130
3. Rural Electrification	13	13	13	15	12	66	15	15	15	15	15	75
4. Acquisition of licenses	..	..	..	..	1	1	..	..	..	..	1	1
Total Outlay ..	88	98	98	75	53	412	115	115	145	145	71	591
B. Finance :												
1. Depreciation Reserve	8.95	10.48	13.06	15.73	19.66	67.88	21.49	23.89	26.14	32.14	36.64	140.30
2. General Reserve	1.55	1.89	2.33	2.89	3.36	12.02	3.71	4.01	4.79	5.66	6.17	24.34
3. Balance amount as loan from State Government/Central Government and Agencies like LIC, Public Borrowings, etc.	77.50	85.63	82.61	56.38	29.98	332.10	89.80	87.10	114.07	107.20	28.19	426.36
Total Finance..	88.00	98.00	98.00	75.00	53.00	412.00	115.00	115.00	145.00	145.00	71.00	591.00

APPENDIX A

INSTALLED GENERATING CAPACITY IN GUJARAT STATE DURING FOURTH FIVE YEAR PLAN

Sr. No.	Power Station	Installed Generating Capacity in MW	Remarks
A.	**Existing and in operation :**		
1	Dhuvaran Thermal Power Station ..	254	
2	Gas Turbines at Dhuvaran	54	
3	Utran Power Station .	67.5	
4	Shapur Power Station ..	16	
5	Porbandar Power Station	15	
6	Sikka Power Station .. .	16	
7	Kandla Power Station	16	(two sets each of 4 MW will be retired during Fourth Plan)
8	Ahmedabad Electricity Co.'s Power Station at Sabarmati (Private Licensee)	217.5	(67.5 MW capacity will be retired during Fourth Plan)
9	Bhavnagar Electricity Supply Co Ltd (Private Licensee).	16	
10	Tarapur Atomic Power Station (Gujarat's Share)	190	
	Sub-total	862	
B.	**Schemes under Execution :**		
11	Dhuvaran Thermal Power Station Extension .	280	
12	Ukai Hydro Electric Power Station .	300	
13	Ukai Thermal Power Station .	240	
	Sub-total ..	820	
	Total ..	1,682	
14	Retirement of old and inefficient sets ..	75	
	Net installed capacity by end of 1973-74 .	1,607 MW	

APPENDIX B

RATE OF GROWTH FOR VARIOUS CATEGORIES OF LOAD IN GUJARAT STATE

Sr. No.	Category	Annual Rate of Growth
1	Domestic and Commercial	15 per cent
2	Water Works	15 per cent and based on No. of villages to be electrified during the period under review.
3	Small Scale Industries (Low tension loads) ..	25 per cent
4.	Medium High Tension Industries (Maximum demand below 1,000 kW)	20 per cent
5.	Large Scale Industries (High tension with maximum demand of 1,000 kW and above)	Based on the industries actually expected to come up during the period covered for survey.
6.	Agricultural	Based on surface wells and tubewells programmed to be electrified during the period under review.
7.	Minerals	On the basis of actual requirements expected.
8.	Transport	On the basis of actual requirements. The programme of electrification of railways will contribute significantly to the growth of load in this category.

APPENDIX C

ELECTRIFICATION OF VILLAGES IN GUJARAT

Population of village. Population group	Number of villages in Gujarat	Number of villages electrified upto 31st March 1971 by Board and Licensees (Large Towns excluded)	Number of villages to be electrified during the next three years of the Fourth Plan	Number of villages to be electrified during the Fifth Plan	Number of villages to be electrified during the Sixth Plan
1	2	3	4	5	6
Over 10,000 ..	7	7		.	.
5,000 to 9,999	141	140	1		
2,000 to 4,999	1,332	1,034	298		.
1,000 to 1,999	3,301	1,340	980	981	
500 to 999 ..	5,299	910	221	2,000	2,168
Up to 499 .	8,504	476	..	1,019	2,757
Total ..	18,584	3,907	1,500	4,000	4,925

The total No. of villages to be electrified by the end of the Sixth Plan . 14,332.

Finance required for Rural Electrification (20,000 pumpsets and 100 tubewells per year and villages as indicated).	Rs. 60 crores	Rs 75.5 crores

APPENDIX D

TRANSMISSION LINES (EXISTING, UNDER CONSTRUCTION AND PROPOSED) BY THE END OF THE FOURTH PLAN

Sr. No.	Line-Section	No. of circuits	Voltage	Route length in kms.	Remarks
1	2	3	4	5	6
1	Tarapur-Navsari	2	220	145	
2	Navsari-Jambuva	2	220	155	
3	Jambuva-Gotri	2	220	15	To be converted into 132 kv during Fifth Plan.
4	Ukai-Jambuva	2	220	130	
5	Ukai-Karamsad	1	220	175	This is proposed to be constructed as a single circuit 400 / 500 kv line up to Jambuva but energised initially at 220 kv.
6	Jambuva-Karamsad-Ranasan	2	220	120	
7	Ranasan-Bhat	2	220	10	
8	Bhat-Mehsana	1	220	65	
9	Karamsad-Limbdi-Gondal	1	220	225	
10	Navsari-Atul	1	132	63	
11	Navsari-Bhestan	1	132	25	
12	Jambuva-Broach	1	132	64	
13	Jambuva-Tilakwada	1	132	60	
14	Jambuva-Nandesari	2	132	40	
15	Nandesari-Bajuva	2	132	10	
16	Gotri-Bajuva	2	132	8	
17	Dhuvaran-Gotri	2	132	46	
18	Dhuvaran-Karamsad	1	132	37	With 0.3 sq. in. ACSR Conductor.
19	Karamsad-Mehmedabad	1	132	32	
20	Dhuvaran-Vatwa	2	132	82	
21	Vatwa-Mehmedabad	1	132	24	
22	Ranasan-Sabarmati	2	132	15	
23	Ranasan-Vatwa	2	132	20	
24	Ranasan-Ta'od	1	132	45	
25	Ranasan-Vijapur	1	132	54	
26	Vijapur-Sidhpur	1	132	55	
27	Mehsana-Sidhpur	1	132	35	
28	From Mehsana to join Vijapur-Sidhpur line.	2	132	25	
29	Mehsana-Nandasan	1	132	45	
30	Dhuvaran-Limbdi-Wankaner	2	132	225	
31	Dhuvaran-Paliad	2	132	145	
32	Paliad-Gondal	2	132	90	
33	Paliad-Dhasa	1	132	52	

APPENDIX D—*concld.*

Sr. No.	Line-Section	No. of circuits	Voltage	Route length in kms.	Remarks
1	2	3	4	5	6
34	Gondal Dhoraji ..	2	132	42	
35	Dhoraji-Talala ..	1	132	95	
36	Dhoraji Ranavav .	1	132	65	
37	Wankaner-Jamnagar ..	2	132	105	
38	Jamnagar Bhatia	1	132	60	
39	Bhatia Mithapur ..	1	132	70	
40	Wankaner-Anjar-Bhuj ..	1	132	191	

APPENDIX D

TRANSMISSION LINES (EXISTING, UNDER CONSTRUCTION AND PROPOSED) BY THE END OF THE FOURTH PLAN

Sr. No.	Line-Section	No. of circuits	Voltage	Route length in kms.	Remarks
1	2	3	4	5	6
1	Tarapur-Navsari	2	220	145	
2	Navsari-Jambuva	2	220	155	
3	Jambuva-Gotri	2	220	15	To be converted into 132 kv during Fifth Plan.
4	Ukai-Jambuva	2	220	130	
5	Ukai-Karamsad	1	220	175	This is proposed to be constructed as a single circuit 400 / 500 kv line up to Jambuva but energised initially at 220 kv.
6	Jambuva-Karamsad-Ranasan	2	220	120	
7	Ranasan-Bhat	2	220	10	
8	Bhat-Mehsana	1	220	65	
9	Karamsad-Limbdi-Gondal	1	220	225	
10	Navsari-Atul	1	132	53	
11	Navsari-Bhestan	1	132	25	
12	Jambuva-Broach	1	132	64	
13	Jambuva-Tilakwada	1	132	50	
14	Jambuva-Nandesari	2	132	40	
15	Nandesari-Bajuva	2	132	10	
16	Gotri-Bajuva	2	132	8	
17	Dhuvaran-Gotri	2	132	46	
18	Dhuvaran-Karamsad	1	132	37	With 0.3 sq. in. ACSR Conductor.
19	Karamsad-Mehmedabad	1	132	32	
20	Dhuvaran-Vatwa	2	132	82	
21	Vatwa-Mehmodabad	1	132	24	
22	Ranasan-Sabarmati	2	132	15	
23	Ranasan-Vatwa	2	132	20	
24	Ranasan-Talod	1	132	45	
25	Ranasan-Vijapur	1	132	54	
26	Vijapur-Sidhpur	1	132	55	
27	Mehsana-Sidhpur	1	132	35	
28	From Mehsana to join Vijapur-Sidhpur line.	2	132	25	
29	Mehsana-Nandasan	1	132	45	
30	Dhuvaran-Limbdi-Wankaner	2	132	225	
31	Dhuvaran-Paliad	2	132	145	
32	Paliad-Gondal	2	132	90	
33	Paliad-Dhasa	1	132	52	

APPENDIX D—*concld.*

Sr. No.	Line-Section		No. of circuits	Voltage	Route length in kms.	Remarks
1	2		3	4	5	6
34	Gondal-Dhoraji	..	2	132	42	
35	Dhoraji-Tala'a	..	1	132	95	
36	Dhoraji-Ranavav	.	1	132	85	
37	Wankaner-Jamnagar	..	2	132	105	
38	Jamnagar-Bhatia	.	1	132	80	
39	Bhatia-Mithapur	.	1	132	70	
40	Wankaner-Anjar-Bhuj	..	1	132	191	

APPENDIX E

PROPOSALS OF TRANSMISSION LINES FOR FIFTH PLAN

Sr. No.	Line-Section	No. of circuits	Voltage kv	Route length in kms.	Remarks
1	2	3	4	5	6
1	Ukai-Jambuva	1	400/500	130	
2	Mahi Bank-Jambuva	1	400/500	90	
3	Mahi Bank-Ranasan	1	400/500	85	
4	Ranasan-Gondal	1	400/500	255	
5	Atomic Power Station-Gondal	1	400/500	170	
6	Rajpardi-Broach	1	220	30	
7	Rajpardi-Tilakwada	1	220	45	
8	Ukai-Bardoli-Navsari	1	220	80	
9	Mahi Bank-Nandesari	2	220	70	
10	Mahi Bank-Godhra-Kadana	1	220	100	
11	Bhat-Mehsana	1	220	65	Second circuit
12	Bhat-Morvi	2	220	195	
13	Morvi-Bhachau	1	220	100	
14	Morvi-Mithapur	1	220	250	
15	Gondal-Vertoj	1	220	155	
16	Gondal-Talala	1	220	140	
17	Gondal-Morvi	1	220	105	
18	Navsari-Atul	1	132	53	Second circuit
19	Atul-Vapi	1	132	18	
20	Navsari-Bhestan	1	132	25	Second circuit
21	Bardoli-Tapi-Bhestan	2	132	40	
22	Tapping to Miyagam	2	132	4	
23	Tapping to Nadiad	2	132	2	
24	Ranasan-Talod	1	132	45	Second circuit
25	Talod-Himatnagar	1	132	30	
26	Mehsana-Deesa	1	132	80	
27	Paliad-Dhasa	1	132	52	Second circuit
28	Bhatia-Ranavav	1	132	75	
29	Mithapur-Bhatia	1	132	70	Will be charged on 132 kv
30	Jamnagar-Bhatia	1	132	80	Second circuit

APPENDIX F

PROPOSALS OF TRANSMISSION LINES FOR SIXTH PLAN

Sr. No.	Line-Section	No. of circuits	Voltage kv	Route length in kms.	Remarks
1	2	3	4	5	6
1	Navagam-Jambuva . ..	2	400/500	80	
2	Atomic Power Station,-Gondal ..	1	400,500	170	Second circuit
3	Ranasan-Gondal . ..	1	400/500	130	Do.
4	Tapping to Vapi . ..	2	220	..	
5	Ukai-Bardoli-Navsari	1	220	80	Second circuit
6	Gondal-Vertoj	1	220	155	Second circuit
7	Vertoj-Talala . ..	1	220	200	Do
8	Lignite Power Station in Kutch-Bachau via Bhuj.	1	220	140	
9	Gondal-Ranavav	1	220	127	
10	Vijapur Himatnagar	1	132	28	
11	Sidhpur Deesa	1	132	45	
12	Mehsana-Nandasan	1	132	45	Second circuit
13	Talala-Kodinar	1	132	35	

APPENDIX G

PERSPECTIVE PLAN

	Fourth Plan (1969-74)		Fifth Plan (1974-79)		Sixth Plan (1979-84)
1. Categorywise Demand :					
(a) High Tension Industries ..	500 MW		1,265 MW		1,900 MW
(b) High Tension Industries	250 MW		500 MW		850 MW
(c) Agricultural	335 MW		585 MW		900 MW
(d) Domestic and others	149 MW		250 MW		350 MW
Total anticipated Maximum Demand ..	1,234 MW		2,600 MW		4,000 MW
2. Generating Capacity Required corresponding to Maximum Demand.	1,600 MW		3,300 MW		5,000 MW
3. Installed Capacity Planned :					
Existing (including Tarapur-190 MW)	802 MW	Available at the commencement of the Plan	1,607 MW	Available at the commencement of Plan	3,127 MW
Dhuvaran Extension Scheme	280 MW	North Gujarat Thermal Station	240 MW	Ukai Thermal Extension Scheme	200 MW
		Ukai Thermal Extension Scheme	200 MW	Narmada Hydro Project	1,150 MW
Ukai Hydro Project	300 MW	Mahi Bank Thermal Station	330 MW	Atomic Power Station	600 MW
		Kadana Hydro Project	240 MW		
Ukai Thermal Station	240 MW	Piparia Hydro Project	20 MW	Total ..	5,077 MW
Total ..	1,682 MW	Ukai Left Bank Canal Station	5 MW	*Less* retirement	75 MW
		Atomic Power Station	600 MW		
Less retirement	75 MW	Total	3,242 MW	Net Total ..	5,002 MW
Net Total ..	1,607 MW	*Less* retirement	115 MW		
		Net Total ..	3,127 MW		
4. Total number of villages / towns to be electrified by the Board.	5,407 (3,907 as on 31st March 1971)		9,407 (4,000 during Plan period)		14,332 (4,925 during Plan period)
5. Irrigation sets to be energised ..	(Already energised as on 31st August 1971 69,072 and 20,000 pumpsets to be energised per year during the next decade).		20,000 pumpsets per year		20,000 pumpsets per year
6. Finance Required :					
(i) Generation Schemes	Rs. 105.70 crores		Rs. 215 crores		Rs. 385 crores
(ii) Transmission and Distribution Schemes	Rs. 53.00 crores		Rs. 130 crores		Rs. 130 crores
(iii) Rural Electrification Schemes ..	Rs. 40.00 crores		Rs. 66 crores		Rs. 75.5 crores
(iv) Miscellaneous	Rs. 1.00 crore		Rs. 1 crore		Rs. 0.5 crore
	Rs. 199.70 crores		Rs. 412 crores		Rs. 591 crores

APPENDIX II

ESTIMATED REQUIREMENTS OF MAJOR LINE MATERIALS AND SUB-STATION EQUIPMENT FOR FIFTH AND SIXTH PLAN SCHEMES

Item	Fifth Plan	Sixth Plan
1. Conductors ACSR and A. A. C. ..	2,15,000 kms.	2,74,000 kms.
2. Insulators	10,00,000 Nos.	10,00,000 Nos.
3. Transformer :		
(a) Distribution	20,000 Nos.	24,000 Nos.
(b) Power transformer .	12,000 MVA	9,000 MVA
4. Steel wires for earthing . ..	5,000 kms.	5,000 kms.
5. Structural steel and steel bars	1,20,000 Tonnes	1,30,000 Tonnes
6. Electrical meters, single phase and three phase	6,25,000 Nos.	6,25,000 Nos.
7. P. S. C. poles and rails ..	8,00,000 Nos.	10,00,000 Nos.
8. Agricultural pumpsets of various capacity	1,00,000 Nos.	1,00,000 Nos.
9. Electrical motors . ..	75,000 kW	1,50,000 kW
10. Electrical fans	2,00,000 Nos	5,00,000 Nos.
11. Electrical lamps and flourescent tubes ..	6,25,00,000 Nos.	8,00,00,000 Nos.
12. Electrical cables	2,00,00,000 Metres	2,00,00,000 Metres
13. Circuit breakers (of all voltages) ..	1,100 Nos.	1,000 Nos.
14. Isolators (of all voltages) ..	2,500 Nos	2,000 Nos.
15. Current transformers (of all voltages) ..	1,000 Nos.	1,500 Nos.
16. Potential transformers (of all voltages) ..	500 Nos.	500 Nos.
17. Lightning arrestors (of all voltages) ..	1,200 Nos.	1,000 Nos.

APPENDIX I

DEVELOPMENT OF POWER OVER THE LAST DECADE

(Facts and figures for power development in the State especially in rural areas)

Sr. No.	Items	1960-61 (End of Second Plan)	1965-66	1966-67	1967-68	1968-69	1969-70	
1	Installed capacity of Gujarat Electricity Board (in MW) (excluding Ahmedabad, Bhavnagar and Surat Licensees).	145	385	378	424	417	596	(Including 190 MW from Tarapur)
2	Capital investment (Rs. in crores) ..	27.15	90.64	103.24	115.26	130.97	159.58	
3	Capital investment in rural electrification (Rs. in crores)	5.01	13.19	18.43	23.99	30.11	38.89	
4	Electrified village areas	671	1,693	2,279	2,628	2,904	3,430	
5	Electrified wells	5,401	15,045	25,927	34,738	38,735	51,983	
6	Electrified tubewells	155	195	334	505	705	788	
7	[illegible]tion of power—for agriculture (in lakh	396	892	1,809	2,083	3,185	3,411	
	on industrial consumers ..	56	155	200	227	252	309	
	n of power-high tention industries s units).	190	444	453	685	798	989	
	th of transmission lines (in circuit-ometres).	9,160	24,315	30,947	37,199	41,222	49,160	
	ber of sub-stations	42	53	104	111	118	130	
	f power (in lakh units)	4,411	9,450	11,750	14,040	17,520	20,130	
	number of consumers	1,40,281	3,86,509	4,45,174	5,07,903	5,58,997	6,41,740	
	capita consumption of electricity (units)	47	74	85	102	112	122	
	Total number of employees	7,014	13,678	14,501	14,035	14,449	14,936	
16	Profit or loss (Rs. in lakhs) ..	—29.59	—135.66	—77.19	—179.00	+10.01	—4.85	

REPORT OF THE WORKING GROUP ON INDUSTRY, POWER AND MINERALS

PART - III

MINERALS

CHAPTER II

MINERAL SURVEY

2.1.1 The State of Gujarat has a total area of 1,87,091 sq. kms. Geologically speaking, the basic complex of the State consists of volcanic rocks except the alluvial plains of north Gujarat and the western borders of the Saurashtra peninsula. Saurashtra region is formed of Deccan lava sheets intersected by trap dykes. Soils in the southern region are deep black, central and northern parts of the State have old alluvium and the Saurashtra region has medium black soils of basaltic origin. All along the coast, saline alluvium is found.

2.1.2 In the Dwarka-Bhavnagar region, clay and sandstone deposits are found. Lignite and coal deposits also occur in Kutch, Surendranagar and Broach districts. The State occupies a very prominent place in the production of oil and natural gas.

2.2 A geological map of the State can be seen. Among the industrial minerals found in Gujarat, important ones are limestone, bauxite, manganese ore, china clay, dolomite, calcite, gypsum, quartz, sandstone, graphite, agate, bentonite, white chalk, fluorite, felspar, marble and building stone materials. Information regarding production of these minerals is given in Appendices A-3 and A-4.

2.3 Survey for minerals conducted by the State Directorate of Geology and Mining has so far indicated reserves of important minerals. Information regarding the known reserves may be found in Appendix B. Even though the Geological Survey of India and the State Directorate have been carrying on the survey work for quite some time, the entire State has not been fully surveyed so far. Our present knowledge regarding the mineral resources and the mineral reserves in the State is, therefore, incomplete. Our first aim should, therefore, be to fill up the information gap.

2.4 Although the approach adopted in the plans on this point has been by and large correct, it is necessary to step up the pace of mineral survey and lay down a definite target date by which the entire State could be fully covered by a systematic survey. It is suggested that by 1981 or at the end of the proposed Ten Year Plan, it should be ensured that the entire State is systematically covered through scientific geological surveys. The requirements of manpower and equipment as well as the requisite administrative measures will have to be worked out with reference to this basic objective.

2.5 Considering the area to be surveyed, it is suggested that the number of survey parties should be gradually increased to 54 by 1973-74. This should be adequate to complete the survey work of the entire State by 1981. An amount of Rs. 527 lakhs should be earmarked towards surveys during the next 10 years. Details of the allocation are given in Statement I. A point may be raised whether the investment suggested is adequate considering the likely returns. The survey for minerals is in the nature of a research and development risk. Unless basic information by systematic geological surveys is calculated, it is not possible to exploit in full the natural resources of the State. The investment on mineral surveys should, therefore, be considered to be an absolute necessity in the context of the development of the mineral sector. The work of mineral survey should in fact be considered basically a promotional activity. Any attempt to restrict the activity or introduce factors like charging for the survey conducted by the Department, etc., even though attractive from a short term point of view, will act basically as a disincentive adversely affecting the investment in the mineral sector and subsequent development.

2.6 Two other aspects remain. A decision will have to be taken whether in future also geological surveys will have to be confined to the Government lands only; geological formations

do not obey man-made boundaries. When surveys are being conducted and a geological formation of economic interest is noticed, it is desirable, scientifically, to delineate the entire contour instead of restricting the survey to Government lands only. From the economic aspect, unless Government takes the initiative and conducts survey, it is not likely that the persons in the private sector will take the initiative of survey for minerals and exploit them. It is, therefore, suggested that in future the survey parties may go mostly by geological considerations and may conduct their surveys both in leased out areas and in private lands. If necessary, administrative and legal measures to empower the survey parties will have to be taken.

2.7 The charter of the Directorate of Geology and Mining imposes at present further restriction on its operations. For instance, the Ground Water Directorate is not a part of the Directorate of Geology and Mining, but is made part of the Public Works Department. It is in the interest of the State, if the Ground Water Directorate is transferred or at least it closely co-ordinates its activities with the Directorate of Geology and Mining in order to optimise returns.

2.8 Systematic mineral survey will not be able to produce the desired results unless it is supported by adequate and up-to-date laboratory facilities. The laboratory of the State Directorate of Geology and Mining has, at present, a petrology and a mineral chemistry wings. A proposal to open an ore-dressing wing is under active consideration. In addition to these three wings, it is essential that the laboratory facilities are further extended by introducing a geophysical wing and a geochemical wing.

2.9 In addition to the development of the laboratory facilities of the Department, it is essential that the State Government takes up with the Central Government as well as the Council of Scientific and Industrial Research the question of opening regional industry-oriented laboratories to supplement the laboratory facilities available with the Department.

2.10 Although the Department laboratory will be primarily meant for the analysis of the survey work done by the Department, it is necessary to throw open the doors of the laboratory to the public as well as private sector also. The laboratory should be able to undertake routine tests on payment of a nominal fee. This will encourage the scientific exploitation of minerals among the private sector. In addition to the departmental laboratories, it is suggested that State Government Corporations like the Gujarat Mineral Development Corporation should develop their own laboratory facilities.

2.11 A word about the techniques of survey will not be out of place here. With the development of advanced techniques, it is essential that due emphasis is given to airborne mineral surveys, mapping on aerial photographs as well as marine geological surveys. So for as marine geology is concerned, one factor in favour of the Gujarat State is its long coast line. The opening of marine geology division in consultation with the Geological Survey *of India is not* only useful from the geological point of view but will also be of assistance to the Directorate *of Ports*. Before undertaking the marine geological surveys, it is necessary to examine the legal aspects regarding the rights of the State Government and the Central Government over the continental shelf.

2.12 Another vital element in the improvement of quality is the *systematic training* of the various personnel of the Directorate of Geology and Mining. A scheme should be drawn up to systematically give training to the various levels of persons in the *Directorate* including training abroad.

2.13 *Increasing* the number of survey parties and making the policy and administrative changes suggested above will maximise the returns by *way of added* scientific and accurate knowledge regarding the mineral wealth of the State at the end of the Perspective Plan.

CHAPTER III

MINERAL EXPLOITATION

3.1 A vital and critical element in the exploitation of mineral is the decision to be taken about the reservation of certain minerals in the public sector. It is imperative to evolve broad guidelines which are well known only.

Generally, the following minerals should be reserved in the public sector:—

(a) Strategic minerals.
(b) Minerals, which require heavy capital expenditure.
(c) Minerals, exploitation of which require a long gestation period.
(d) Minerals, for exploiting which capital is shy.

3.2 The Gujarat Mineral Development Corporation is the public sector undertaking in the mineral sector of the State. This Corporation is presently engaged in mining and beneficiation of fluorspar at Kadipani, mining of bauxite in Kutch and Jamnagar districts and silica sand mining and processing at Surajdeval in Surendranagar district. The projects envisaged to be taken up in near future are the mining of lignite and siderite deposits in Kutch, setting upon an Alumina Plant in public sector in Kutch and exploitation of base metal deposits in Amba Mata area. The highlights of various projects and their future development are as follows.

3.3 Fluorspar Project

3.3.1 This project is located at Kadipani in the Baroda district. The plant has an input capacity of 500 tonnes of run of mine ore per day having about 20-25 per cent CAF content. The plant is currently engaged in stabilising and standardising concentrates.

3.3.2 In order to meet the increasing demands and fulfil the requirements of the domestic industries, the Corporation will have to expand the mining and beneficiation capacity in order to quadruple the present rated capacity.

3.4 Bauxite Project

The Corporation is currently engaged in the development of bauxite deposits around Wandh village in Kutch district and Mevasa village in Jamnagar district, with a view to assess the grade, depth and behaviour of ore to be fed to the proposed alumina plant to be set up under a separate company. This export-oriented plant having capacity of two lakh tonnes will be fed with bauxite from Kutch and Jamnagar districts and will produce alumina in the first phase. Afterwards with the availability of sufficient technical know-how, power and water supplies, it is envisaged to go in for an aluminium smelter of the capacity of 50,000 to 1,00,000 tonnes with rolling mills and fabrication facilities with a total investment of Rs. 130 crores.

3.5 Base Metal Project

The Corporation has currently undertaken the exploratory mining of base metal deposits proved by the Geological Survey of India at Ambaji. The lease has recently been cancelled but as the ultimate decision is not clear, it is necessary that the Corporation is ready to take up the project at a future date.

3.6 Silica Sand Project

The Corporation is working the sandstone mines in Surajdeval area with a processing plant for recovery of silica sand at Surajdeval. The ore, after mining, is directly fed to the plant and

silica sand of various mesh sizes is recovered. It is planned to process the silica sand further by washing and classifying in order to get a higher grade.

3.7 Lignite Project

Large reserves of lignite have been proved by the Directorate of Geology and Mining in Kutch district scattered over a wide area. About 184 million tonnes of good quality of lignite has been proved in the Panandhro and Akrimota areas in Lakhpat taluka. Last year, the Corporation developed a pilot quarry and collected about 200 tonnes of lignite which were later sent to the Central Fuel Research Institute, Dhanbad, for feasibility studies. After the data, both from Ground Water Directorate and the Central Fuel Research Institute are received, the Corporation will be in a position to submit a detailed report to the Government of Gujarat for setting up a thermal power plant of 100-150 MW in the Kutch district.

3.8 It will not be out of place to recall the known data of the utility of Kutch lignite for power generation. For conventional thermal, power station, lignite with 35 per cent to 45 per cent moisture will be suitable for operation. The analytical result of Kutch lignite so far shows moisture content around 34.5 per cent.

3.9 The next important aspect so far as the exploitation of Kutch lignite for power generation is the over-burden ratio. Experience obtained in the lignite operation in the Neyveli is relevant in this connection. The lignite, to over-burden ratio in Kutch is 1·5 to 1.6 and the lignite to over-burden ratio at Neyveli is 1 to 3.3. It is estimated that a conventional thermal plant of 150 MW can be set up based on the lignite of Kutch. The calorific value of Kutch lignite varies from 2620 to 3930 Kcal Kg. The sulphur content varies between 1.55 to 3.18 per cent. The Kutch lignite can be exploited for generation of power from either open cast mining and using the lignite for power generation or undergound gassification and the utilisation of gas for power generation on account of high sulphur content. The latter alternative should be carefully studied.

3.10 Another important factor that will have to be examined in depth before setting up the power plant is the availability of water. A large quantum of water is one of the primary requirements for a thermal power station. At least a supply of water to the extent of 1 cubic metre per second will be required to run a plant of 150 MW. The high sulphur may also off-set the advantage of higher calorific value.

The final decision regarding the setting up of a power plant will depend upon the feasibility report of the Central Fuel Research Institute.

3.11 Moreover, the Corporation is also considering that at a later date, it may have to undertake development of china clay and graphite after their deposits are sufficiently proved by the Directorate of Geology and Mining.

3.12 It is estimated to make a total provision of Rs. 21,120 lakhs on different projects as under :—

		(Rs. in lakhs)
1.	Fluorspar Project	1,800
2.	Glass Sand Project	20
3.	Bauxite Mining and Alumina	13,000
4.	Lignite (Excluding Power Plant)	3,600
5.	Base Metal	2,500
6.	Miscellaneous Projects	200
		21,120

CHAPTER III

MINERAL EXPLOITATION

3.1 A vital and critical element in the exploitation of mineral is the decision to be taken about the reservation of certain minerals in the public sector. It is imperative to evolve broad guidelines which are well known only.

Generally, the following minerals should be reserved in the public sector:—

(a) Strategic minerals.
(b) Minerals, which require heavy capital expenditure.
(c) Minerals, exploitation of which require a long gestation period.
(d) Minerals, for exploiting which capital is shy.

3.2 The Gujarat Mineral Development Corporation is the public sector undertaking in the mineral sector of the State. This Corporation is presently engaged in mining and beneficiation of fluorspar at Kadipani, mining of bauxite in Kutch and Jamnagar districts and silica sand mining and processing at Surajdeval in Surendranagar district. The projects envisaged to be taken up in near future are the mining of lignite and siderite deposits in Kutch, setting upon an Alumina Plant in public sector in Kutch and exploitation of base metal deposits in Amba Mata area. The highlights of various projects and their future development are as follows.

3.3 Fluorspar Project

3.3.1 This project is located at Kadipani in the Baroda district. The plant has an input capacity of 500 tonnes of run of mine ore per day having about 20-25 per cent CAF content. The plant is currently engaged in stabilising and standardising concentrates.

3.3.2 In order to meet the increasing demands and fulfil the requirements of the domestic industries, the Corporation will have to expand the mining and beneficiation capacity in order to quadruple the present rated capacity.

3.4 Bauxite Project

The Corporation is currently engaged in the development of bauxite deposits around Wandh village in Kutch district and Mevasa village in Jamnagar district, with a view to assess the grade, depth and behaviour of ore to be fed to the proposed alumina plant to be set up under a separate company. This export-oriented plant having capacity of two lakh tonnes will be fed with bauxite from Kutch and Jamnagar districts and will produce alumina in the first phase. Afterwards with the availability of sufficient technical know-how, power and water supplies, it is envisaged to go in for an aluminium smelter of the capacity of 50,000 to 1,00,000 tonnes with rolling mills and fabrication facilities with a total investment of Rs. 130 crores.

3.5 Base Metal Project

The Corporation has currently undertaken the exploratory mining of base metal deposits proved by the Geological Survey of India at Ambaji. The lease has recently been cancelled but as the ultimate decision is not clear, it is necessary that the Corporation is ready to take up the project at a future date.

3.6 Silica Sand Project

The Corporation is working the sandstone mines in Surajdeval area with a processing plant for recovery of silica sand at Surajdeval. The ore, after mining, is directly fed to the plant and

Jamnagar District/(For bauxite mines) :

(1) 24 kms. link road required for Jamnagar, Virpur, Ran, Bhoplka. Bhoplka is 8 kms. away from highway.
(2) About 12 kms. link road required from Maha-Devia to highway.
(3) About 27 kms. link road *via* Hadmatia required from Lamba Gandhvi to Bhatia station.

Bhavnagar District/(For bentonite mines) :

(1) 23 kms. link road required from Bhavnagar to Lakhnaka for bentonite leases.

Junagadh District / (Whiting chalk mines of Porbandar) :

(1) Link road requirement about 24 kms. to connect to the main road of Ranavav.

Surendranagar District / (Fire clay mines) :

(1) Link road required from Vagadia to Muli on Surendranagar-Rajkot Road.

3.17.2 Considering the investment that is to be made by GMDC for the development of lignite and bauxite, link roads in Kutch should get high priority.

3.18 Power is another basic ingredient required for mineral industry. It is learnt that no priority is given by the Gujarat Electricity Board in allocation of power to mineral industry. It is suggested that the entire position may be reviewed and the Gujarat Electricity Board may be requested to give due priority to the mineral industry in allocation of power Power should be given at the point of consumption by the mineral industry as in the case of agriculture. In view of the fact that the mineral industry will generally be in the backward areas, it will help in achieving the Gujarat Electricity Board's objective of balanced economic development by giving priority to mineral industry in allocation of power.

3.19.1 For transport, the mineral industry mainly depends upon railways rather than on roads. This may be because of the goods to be transported and the freight of the goods. It has been one of the recurring complaints of the mineral industry that due priority is not given to the mineral industry in the allotment of wagons. Considering the fact that minerals are of strategic importance and they form raw materials for many industries, high priority needs to be given to the minerals so far as allotment of wagons is concerned. Lack of wagons is one of the greatest bottlenecks in the mineral industry today and no time should be lost to set right the situation.

3.19.2 It is also essential that there is a built-in system in the consultative machinery of the railways which will take care of the needs of the mineral industry. It is suggested that a representative of the mineral industry may be given due place in the various boards of railways.

3.20 As mineral industry is basically capital intensive, it is essential that adequate financial facilities are given to encourage investment in this sector. The Financial Corporation of the State Government should extend the facility on a more liberal basis to the mineral-based industries and industries meant for exploitation of minerals. The quantum of assistance to be given will depend upon the assessment of the production to be expected from mineral-based industries. The financial assistance to mineral-based industries by Government financial agencies and banks during the last 10 years is practically nil. For example, Gujarat Industrial Development Corporation and Gujarat Industrial Investment Corporation had advanced only Rs. 17.44 lakhs during the last 10 years to mineral industry. The financial allocation for assistance to mineral industry during the span of the next 10 years should commensurate with production requirements of minerals for the industry.

The mineral industry should be treated on par with other industries as regards advancement of loan, etc.

3.21.1 The possibility of exploiting the export potential of some of the minerals should not be lost sight of. After meeting the domestic needs, we may consider the possibility of exporting bauxite. The question of exporting manganese ore from Shivrajpur after blending the ore with the other high grade ores available in the country should be examined. Bentonite from the State is being exported. In future, this mineral holds a bright prospect for earning foreign exchange from export market. Special concessions should be given to such minerals which are foreign exchange earners so that the mineral industries engaged in such minerals can get an additional boost and thus indirectly help in the generation of necessary foreign exchange in the development programme.

3.21.2 Even though exploitation of the mineral is a capital intensive activity it has significant employment potential also. The number of persons employed in the mineral industries in 1970 was about 20,000. It is likely to increase annually at the rate of 10 per cent during the period of perspective planning, if various suggestions regarding the investment and administrative reforms suggested in this report are implemented.

3.22 The Gujarat Mineral Development Corporation's various schemes would require around Rs. 211 crores as listed in para 3.12. Out of this outlay, an amount of Rs. 155 crores is for alumina/aluminium smelter, fabrication facilities and base metal beneficiation. A provision of Rs. 155 crores has been indicated in the industries sector. Therefore, a net provision to be made for the GMDC would be Rs. 56 crores. Out of this outlay the State may have to contribute 50 per cent, the other 50 per cent being obtained by the GMDC by way of loan from the open market. Thus the State will have to contribute to the tune of Rs. 28 crores for the Gujarat Mineral Development Corporation's schemes, apart from the aluminium smelter and base metal projects. In addition, the geological surveys and exploratory activities of the Directorate of Geology and Mining would require an amount of nearly Rs. 5 crores. An additional provision of Rs. 5 crores has also been suggested for link and approach roads. Thus the total provision for the State outlay would be as follows :—

	(Rs. in crores)
GMDC schemes	28
Directorate of Geology and Mining schemes ..	5
Link roads	5
Total ..	38

Allowing for unforeseen expenditure and escalations due to price increases, we make a provision for Rs. 40 crores, out of which Rs. 20 crores will be required during the Fifth Plan and another Rs. 20 crores during the Sixth Plan.

CHAPTER IV

MINERAL ADMINISTRATION

4.1 The need for scientific exploitation of minerals has been discussed in the earlier chapter. Government is the ultimate owner of the various mineral resources and it is, therefore, for it to ensure that the exploitation is done in a scientific manner and it brings to the Government treasury its due share of royalty. The Directorate of Geology and Mining is mainly concerned with the mineral administration and conservation of minerals and collection of royalty.

4.2 To ensure scientific exploitation of minerals, it is suggested that the Directorate of Geology and Mining should take more initiative and evolve norms which will automatically ensure that the principles of mineral conservation are properly observed. To give proper and scientific guidance to those engaged in the exploitation of minerals, it is necessary to create a techno-economic section in the Directorate. The section should undertake techno-economic surveys as well as feasibility studies and actively encourage entrepreneurs for exploitation of minerals.

4.3 The department was reorganised with effect from 1st April 1971 so that instead of the regional officer in every district, the Collector is the main officer in charge of the mineral administration assisted by a technical officer of the Directorate of Geology and Mining. In view of the fact that the revenue authorities are also concerned with other matters, there is apprehension in certain quarters of the mineral industry that there may be avoidable delay in mineral administration like granting of lease and permits, etc. It would, however, be best to give the reorganisation a fair trial before considering any further changes.

4.4. The administration of minerals is generally covered by mineral rules. The minor minerals are governed by the Gujarat Minor Mineral Rules and the major minerals by the Mineral Concession Rules. The basis for both is the Mines and Minerals Regulation and Development Act and there are also enactments and rules for exploitation of minerals like Mineral Conservation and Development Rules, Mines Act, Metalliferous Mines Regulation, etc. These rules need to be systematically studied to ensure simplification of procedures.

CHAPTER V

CONCLUSIONS

5.0 In the foregoing chapters an analysis has been made of the various aspects of the mineral industry in the context of the proposed Ten Year Plan. The major conclusions that emerge from the analysis may now be briefly recalled.

5.1 It is suggested that by 1981 or at the end of the proposed Ten Year Plan, it should be ensured that the entire State is systematically covered through scientific geological surveys. The requirements of manpower and equipment as well as the requisite administrative measures will have to be worked out with reference to this basic objective. (para 2.4)

5.2 Considering the area to be surveyed, it is suggested that the number of survey parties should be gradually increased to 54 by 1973-74. This should be adequate to complete the survey work of the entire State by 1981. An amount of Rs. 527 lakhs should be earmarked towards surveys during the next 10 years. Details of the allocation are given in Statement I (para 2.5).

5.3 It is suggested that in future, the survey parties may go mostly by geological considerations and may conduct their surveys both in leased out areas and in private lands. If necessary, administrative and legal measures to empower the survey parties will have to be taken (para 2.6).

5.4 It is in the interest of the State if the Ground Water Directorate is transferred or at least it co-ordinates its activities with the Directorate of Geology and Mining (para 2.7).

5.5 Systematic mineral survey will not be able to produce the desired results unless it is supported by adequate and up-to-date laboratory facilities. The laboratory of the State Directorate of Geology and Mining has, at present, a petrology and a mineral chemistry wings. A proposal to open an ore-dressing wing is under active consideration. In addition to these three wings, it is essential that the laboratory facilities are further extended by introducing a geophysical wing and a geochemical wing (para 2.8).

5.6 In addition to the development of the laboratory facilities of the department, it is essential that the State Government takes up with the Central Government as well as the Council of Scientific and Industrial Research the question of opening regional industry-orientedl aboratories to supplement the laboratory facilities available with the department (para 2.9).

5.7 Although the department laboratory will be primarily meant for the analysis of the survey work done by the department, it is necessary to throw open the doors of the laboratory to the public as well as private sector also. The laboratory should be able to undertake routine tests on payment of a nominal fee. This will encourage the scientific exploitation of minerals among the private sector. In addition to the departmental laboratories, it is suggested that State Government Corporations like the Gujarat Mineral Development Corporation should develop their own laboratory facilities (Para 2.10).

5.8 With the development of advanced techniques, it is essential that due emphasis is given to airborne mineral surveys, mapping on aerial photographs as well as marine geological surveys (para 2.11).

5.9 A scheme should be drawn up to systematically give training to the various levels of persons in the Directorate including training abroad (para 2.12).

5.10 It is desirable to evolve broad guidelines so that the private sector does not become *shy of investing money in the mineral industry.*

Generally, the following minerals should be reserved in the public sector :—

(*a*) Strategic minerals.
(*b*) Minerals, which require heavy capital expenditure.
(*c*) Minerals, exploitation of which require a long gestation period.
(*d*) Minerals, for exploiting which capital is shy. (para 3.1)

5.11 It is estimated to make a total provision of Rs. 21,120 lakhs on different projects of the Gujarat Mineral Development Corporation which should be as under :—

		(Rs. in lakhs)
1.	Fluorspar Project	1,800
2.	Glass Sand Project	20
3.	Bauxite Mining and Alumina	13,000
4.	Lignite (excluding power plant) . ..	3,600
5.	Base Metal	2,500
6	Miscellaneous Projects . .	200
	(Para 3.12)	21,120

Out of this, the revised provisions for 3 and 5 have been transferred to Industries Section.

5.12 It is suggested that the provision of funds for construction of roads (both approach roads and major roads) should be substantially increased. A minimum of Rs. 5 crores should be earmarked during the next ten years for this purpose. It may be added that construction *of such roads serve a dual purpose. In addition to their direct impact on the growth of the* mineral industry, they also act as harbingers of economic progress in the backward areas, because mineral occurrences are generally in such areas (para 3.16.1 and 3 16 2).

5.13 The Gujarat Electricity Board may be requested to give due priority to the mineral industry in allocation of power. Power should be given at the point of consumption by the mineral industry as in the case of agriculture (para 3.18).

5.14 Considering the fact that minerals are of strategic importance and they form raw materials for many industries, high priority may be given to the minerals so far as allotment of wagons is concerned. It is suggested that a representative of the mineral industry may be given due place in the various boards of railways (para 3.19.1 and 3.19.2).

5.15 The financial allocation for assistance to mineral industry during the span of the next 10 years should be commensurate with production requirements of minerals for the industry. The mineral industry should be treated on par with other industries as regards advancement of loan, etc. (para 3.20).

5.16 Special concessions should be given to such minerals which are foreign exchange earners so that the mineral industry engaged in such minerals can get an additional boost and thus indirectly help in the generation of necessary foreign exchange in the development programme (para 3.21).

5.17 To give proper and scientific guidance to those engaged in the exploitation of minerals, it is necessary to create a techno-economic section in the Directorate. The section should undertake techno-economic surveys and feasibility studies and activity so as to encourage entrepreneurs for exploitation of minerals (para 4.2).

5.18 The administration of minerals is generally covered by min [illegible] ies have to be systematically studied to simplify the procedures (para 4.4

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5.18 The administration of minerals is generally covered by mineral rules. These rules have to be systematically studied to simplify the procedures (para 4.4).

STATEMENT I

Financial targets proposed towards the survey parties

(Rs. in lakhs)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
1-A. (i) Pre-detailed Mineral Survey ..	3.07	4.03	4.40	4.84	5.32	5.85	6.43	7.07	7.77	8.54
(ii) Detailed Mineral Survey	4.88	5.30	5.80	6.47	7.11	7.82	8.60	9.46	10.40	11.44
(iii) Drilling	16.96	18.65	21.51	22.56	24.81	27.29	30.01	33.01	36.31	39.94
(iv) Development of Mineral Laboratory	3.66	4.02	4.42	4.88	5.34	5.87	6.45	7.09	7.79	8.56
(v) Library	0.24	0.26	0.28	0.31	0.34	0.37	0.40	0.44	0.48	0.53
(vi) Workshop	0.91	1.00	1.10	1.21	1.33	1.46	1.60	1.76	1.93	2.12
(vii) Periodicals and investigation reports, technical planning and mineral administration.	5.00	5.50	6.05	6.65	7.31	8.04	8.84	9.72	10.69	11.75
1-B. Exploratory Mineral Development ..	5.00	5.50	6.05	6.65	7.31	8.04	8.84	9.72	10.69	11.75
1-C. Technical assistance from experts etc. ..	10.00	11.00	12.10	13.31	14.64	16.10	17.71	19.48	21.42	23.56
2 Mineral Survey in the State	7.73	8.45	9.16	10.07	11.07	12.17	13.37	14.71	16.18	17.79

APPENDIX A-3

NATIONAL INCOME FROM THE MINING SECTOR AT CURRENT PRICES*

(By States)

(in '000 Rs.)

Sr. No.	States	1969	Percentage to all India Total	1970	Percentage to all India Total
	India	33,13,776	100.00	33,28,627	100.00
1	Andhra Pradesh	1,29,882	3.92	1,27,532	3.84
2	Assam	2,35,219	7.10	2,37,014	7.12
3	Bihar	10,13,791	30.59	9,96,681	29.94
4	Delhi	1,400	0.04	1,421	0.04
5	Goa	61,424	1.85	73,765	2.22
6	Gujarat	2,86,232	8.64	2,89,879	8.71
7	Haryana	5,971	0.16	5,972	0.18
8	Himachal Pradesh	1,598	0.05	1,577	0.05
9	Jammu and Kashmir	1,659	0.06	1,917	0.06
10	Kerala	10,161	0.31	10,192	0.31
11	Madhya Pradesh	4,40,785	13.30	4,77,839	14.36
12	Maharashtra	67,233	2.03	70,763	2.13
13	Mysore	87,697	2.65	88,343	2.65
14	Orissa	1,64,830	4.97	1,68,155	5.05
15	Punjab	763	0.02	754	0.02
16	Rajasthan	85,593	2.58	88,727	2.67
17	Tamil Nadu	99,691	3.01	88,348	2.65
18	Uttar Pradesh	80,967	2.44	81,013	2.43
19	West Bengal	5,38,880	16.26	5,18,279	15.57

*Excluding the contribution of atomic minerals and common salt. The net value of minor minerals for the year 1968 has been repeated for the years 1969 and 1970 as the gross value is not available.

Source :—Indian Bureau of Mines, Nagpur.

APPENDIX A-2

VALUE OF MINERAL PRODUCTION* (a)

('000 Rs.)

Calendar year	Gujarat	India	Share of the States
1960	21,826	16,50,656	1.32
1961	30,110	18,12,081	1.66
1962	44,383	21,27,645	2.09
1963	76,388	24,27,086	3.16
1964	83,379	25,24,400	3.30
1965	1,22,946	29,05,161	4.23
1966	2,60,259	32,56,923	7.99
1967	3,23,548	37,11,994	8.72
1968	3,44,073	41,64,236	8.26
1969	4,08,819	42,84,766	9.54
1970	4,14,254	42,96,311	9.64

(a) Including Goa

*Figures from 1960 to 1970 exc'ude the value of output of atomic minerals. In addition to these; the figures for the 1969 and 1970 are exclusive of minor minerals.

Source :—Indian Bureau of Mines, Nagpur.

APPENDIX A-3

MINERAL PRODUCTION IN GUJARAT, 1970

Sr. No.	Name of the minerals	No. of Mines	Production in tonnes	Value ('000 Rs.)	Average production per mine
1	Natural Gas *	1	316	15,820	316
2	Petroleum ‡	7	34,51,000	3,77,194(†)	4,93,000
3	Bauxite	26	2,44,508	4,014	9,404
4	Agate	4	729	112	185
5	Ballclay	1			
6	Calcite	17	6,412	81	377
7	Chalk	21	46,904	801	2,234
8	China clay (Saleable)	10	1,942	17	194
9	China clay (Non saleable)		47,876	..	4,788
10	China clay (Processed)		11,435	1,556	1,144
11	Dolomite	21	60,702	517	2,891
12	Felspar	1	39	..	39
13	Fire clay	45	1,02,210	450	2,271
14	Fluorite	1	1,900	1,198	1,900
15	Gypsum	5	1,275	29	238
16	Limestone	36	20,91,603	10,983	58,100
17	Calcarious Sand	2	9,96,201	1,154	4,98,101
18	Ochre	1	334	10	384
19	Quartz	6	16,709	92	2,783
20	Silica sand	8	32,799	201	*4,100
21	Moulding sand	7	67,952	63	9,712
		220		4,14,254	

(†) Estimated

* = Figures relate to gas utilised in million cubic metres

‡ = Relates to 1969.

Source :—Indian Bureau of Mines, Nagpur.

APPENDIX A-4

MINERAL PRODUCTION IN GUJARAT AND THE COUNTRY AND SHARE AND RANK OF STATE IN THE COUNTRY, 1970

Sr. No.	Mineral	Gujarat (in tonnes)	India (in tonnes)	Share of the State	Rank of the State
1	Petroleum (Crude)*	3,452	6,809	50.68	1
1	Natural Gas †	316	676	46.75	2
3	Agate	739	739	100.00	1
4	Bauxite	2,44,508	13,59,641	17.98	2
5	Calcite	6,414	15,307	39.32	2
6	Chalk	46,904	46,904	100.00	1
7	China clay (non-saleable) ..	47,876	3,36,630	14.22	8
8	China clay (saleable)	1,942	2,01,795	0.96	10
9	China clay (processed)	11,435	1,02,123	11.20	5
10	Dolomite	60,702	11,34,966	5.35	8
11	Felspar	39	29,255	0.13	5
12	Fireclay	1,02,210	5,09,271	20.07	2
13	Fluorite	1,900	4,647	40.88	2
14	Gypsum	1,275	8,82,735	0.14	4
15	Limestone and calcarious materials	20,91,605	2,35,64,975	8.88	7
16	Calcarious sand	9,96,201	9,96,201	100.00	1
17	Ochra	384	37,682	1.02	6
18	Quartz	16,709	1,68,071	9.94	4
19	Silica sand	32,799	2,48,924	13.18	3
20	Moulding sand	67,952	4,88,612	13.91	5

* = '000 tonnes

† = Figures relate to gas utilised in million cubic metres.

Source.—Mineral Statistics of India Vol. III No. I January 1971.

APPENDIX A-5

PRODUCTION BY PRIVATE AND PUBLIC SECTOR DURING THE YEAR 1970

Sr. No.	Name of Mineral	Private sector production	Public sector production	Total
1	Agate	743	..	743
2	Bauxite	2,24,211	21,468	2,45,679
3	Calcarious sand	3,96,493		3,96,493
4	Calcite	7,434		7,434
5	Chalk	47,963	.	47,963
6	China clay	50,279(C) 11,753(R)		50,279(C) 11,753(R)
7	Clay ..	81,842		81,842
8	Colour ochre .. .	384		384
9	Dolomite ..	60,747		60,747
10	Felspar ..	43		43
11	Fire clay ..	95,966		95,966
12	Fluorspar ..	..	53,081(C) 1,999 (Acid Grade)	53,081(C) 1,999 (Acid Grade)
13	Glass sand	...	4,390	4,390
14	Graphite .. .	709		709
15	Gypsum	1,456		1,456
16	Limestone .. .	21,19,188		21,19,188
17	Marble .	714		714
18	Moulding sand .. .	4,888		4,888
19	Pipe clay . ..	3,385		3,385
20	Plastic clay . . .	23,841		23,841
21	Quartz ..	19,071		19,071
22	Sandstone	74,944		74,944
23	Sea sand	5,99,708	..	5,99,708
24	Silica sand .. .	34,974	..	34,9[illegible]

Source : Directorate of Geology and Mining.

APPENDIX B

ESTIMATED RESERVES OF VARIOUS MINERALS IN GUJARAT STATE

Mineral	District	Estimated reserves (Million tonnes)
Agate	Broach, Bhavnagar, Kutch, Rajkot	..
Asbestos	Sabarkantha.	..
Bauxite	Amreli, Bulsar, Bhavnagar, Jamnagar, Junagadh, Kaira, Kutch, Sabarkantha.	29.150
Bentonite	Amreli, Banaskantha, Bhavnagar, Broach, Jamnagar, Kutch, Mehsana, Sabarkantha, Baroda.	0.600
Calcite	Amreli, Banaskantha, Baroda, Bhavnagar, Broach, Jamnagar, Junagadh, Panchmahals, Rajkot.	0.087
China clay	Mehsana, Sabarkantha, Surat.	6.820
Clay	Amreli, Mehsana, Sabarkantha, Surendranagar, Rajkot.	..
Chalk	Bhavnagar, Jamnagar, Junagadh.	..
Coal	Surendranagar.	2.900
Dolomite	Amreli, Baroda, Bhavnagar, Broach.	..
Felspar	Banaskantha, Baroda, Panchmahals.	..
Fire clay	Amreli, Mehsana, Panchmahals, Surendranagar, Rajkot.	..
Fluorite	Baroda, Sabarkantha.	11.600
Fuller's Earth	Bhavnagar, Kutch.	..
Graphite	Panchmahals.	1.695
Gypsum	Amreli, Bhavnagar, Broach, Jamnagar, Junagadh, Kutch, Surendranagar.	6.540
Lignite	Broach, Kutch.	205.000
Limestone	Amreli, Banaskantha, Baroda, Bhavnagar, Broach, Jamnagar, Junagadh, Kutch, Kaira, Panchmahals, Surat, Sabarkantha.	10,814.280
Manganese Ore	Baroda, Panchmahals, Sabarkantha.	3.000
Marble	Banaskantha, Baroda.	45.000
Petroleum and Natural Gas.	Ahmedabad, Baroda, Broach, Bhavnagar, Kaira, Mehsana, Surat (Oil reserve).	..
Quartz and Silica Sand	Baroda, Panchmahals, Kutch, Sabarkantha, Surendranagar.	6.420
Red Ochre	Amreli, Banaskantha, Broach, Jamnagar, Junagadh, Kutch.	.
Salt	Ahmedabad, Amreli, Bhavnagar, Jamnagar, Junagadh, Kutch, Rajkot, Surendranagar.	.
Steatite	Baroda, Panchmahals, Sabarkantha.	..

APPENDIX C

ANTICIPATED REQUIREMENTS OF MINERALS AND PRODUCTION OF MINERAL PRODUCTS

Sr. No.	Mineral	Mineral product	Anticipated production of mineral product 1970-71 (Quantity in tonnes)	1973-74 (Quantity in tonnes)	1978-79 (Quantity in tonnes)	1983-84 (Quantity in tonnes)	Total anticipated requirement of mineral by the year 1983-84 (Quantity in tonnes)	
1	Limestone ..	Soda ash	4.1 lakhs	4.1 lakhs	7.5 lakhs	10 lakhs	2 million	5.35 million
2	—Do— ..	Cement and cement products	1.6 million	2 million	3 million	4.5 million	3.35 million	
3	Gypsum	—Do—	—Do—	—Do.—	—Do—	—Do.—	0.225 million	
4	Fluorite ..	Fluorite Chemicals	10,000	30,000	60,000	1,20,000	6,00,000	
5	Clays	Ceramic Products	30,000	30,000	60,000	1,20,000	60,000	
6	Bauxite	Alumina	..	..	1 lakh	2 lakh	5 lakh	5,30,000
7	—Do.—	Calcined Bauxite	6,000	6,000	12,000	20,000	30,000	
8	Bentonite	Bleaching Earth	5,000	10,000	15,000	20,000	30,000	
9	Graphite .	Graphite Crucibles etc	1,000	2,000	3,000	3,000	3,000	
10	Marble .	Building stone	1,000	3,000	5,000	10,000	10,000	
11	Quartz and Silica sand.	Glass Products	15,000	30,000	50,000	75,000	75,000	

APPENDIX D.

DISTRICTS WHICH HOLD PROSPECTS FOR MINERAL-BASED INDUSTRIES

Sr. No.	Name of Mineral	Districts
1	Agate	Broach, Kutch.
2	Bauxite	Kutch, Jamnagar, Junagadh, Amreli, Bhavnagar, Kaira, Surat, Bulsar.
3	Bentonite, Fuller's Earth	Kutch, Jamnagar, Amreli, Bhavnagar, Banaskantha, Sabarkantha, Broach.
4	Calcite	Jamnagar, Junagadh, Rajkot, Amreli, Bhavnagar, Banaskantha, Baroda, Broach.
5	China Clay	Mehsana, Sabarkantha, Panchmahals.
6	Chalk	Jamnagar, Junagadh, Bhavnagar.
7	Coal/Lignite	Kutch, Surendranagar, Broach.
8	Dolomite	Baroda, Broach.
9	Felspar	Banaskantha, Panchmahals, Baroda.
10	Fire clay/Plastic clay	Bulsar, Surat, Sabarkantha, Mehsana, Surendranagar, Rajkot.
11	Fluorspar	Baroda, Broach.
12	Graphite	Baroda, Panchmahals.
13	Gypsum	Kutch, Jamnagar, Junagadh.
14	Limestone	Surat, Broach, Baroda, Panchmahals, Kaira, Sabarkantha, Banaskantha, Surendranagar, Bhavnagar, Amreli, Junagadh, Rajkot, Jamnagar, Kutch.
15	Manganese Ore	Baroda, Panchmahals.
16	Marble	Baroda, Banaskantha.
17	Mica	Panchmahals.
18	Moulding Sand	Surendranagar, Bhavnagar, Jamnagar.
19	Nepheline Syenite	Junagadh.
20	Ochre	Kutch, Banaskantha, Bhavnagar.
21	Petroleum and Natural Gas	Surat, Broach, Baroda, Kaira, Ahmedabad, Gandhinagar, Mehsana.
22	Quartz and Silica Sand	Baroda, Panchmahals, Surendranagar, Kutch, Sabarkantha.
23	Salt	Kutch, Jamnagar, Junagadh, Amreli, Rajkot, Surendranagar, Bhavnagar.
24	Sandstone and other Building stone	Bulsar, Broach, Baroda, Panchmahals, Kaira, Sabarkantha, Ahmedabad, Banaskantha, Kutch, Surendranagar, Rajkot, Jamnagar, Junagadh, Amreli, Bhavnagar.
25	Sea Sand	Jamnagar.
26	Steatite-Soap stone	Baroda, Panchmahals, Sabarkantha.
27	Wollastonite	Banaskantha.
28	Zink/Lead/Copper	Banaskantha.

PERSPECTIVE PLAN OF GUJARAT 1974-1984

REPORT OF THE WORKING GROUP ON TRANSPORT AND COMMUNICATIONS

PERSPECTIVE PLAN
OF
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PREFACE

The State Planning Advisory Board decided on the 5th July, 1971 that the outline of a Perspective Plan for the ten year period from 1974 to 1984 should be prepared and published Accordingly, the Government of Gujarat appointed several Working Groups to prepare the Perspective Plan. A Steering Group was also appointed to co-ordinate the reports of the Working Groups and to prepare the outline of a consolidated Plan for the State. Full employment, more production, equitable distribution, diffusion of economic power and balanced development have been given as the basic Objectives of the Plan

2. The Working Group for Transport and Communications was constituted a month later, on the 7th August, 1971 by Government Resolution, General Administration Department, No. TYP-1074-D, with the following members :—

Shri K T. Satarawala, Adviser to Governor.	Chairman
Shri Rohitbhai C. Mehta, Chairman, Gujarat Export Corporation, Ahmedabad.	Member
Shri Balkrishna Harivallabhdas, President, Gujarat Chamber of Commerce and Industry, Ahmedabad.	"
Dr. Samuel Paul, Indian Institute of Management, Ahmedabad	"
Shri K. M Kantawala, Chairman, Gujarat Housing Board, Ahmedabad	"
Shri M. D. Patel, Chief Engineer (Roads and Buildings) and Joint Secretary to Government, Public Works Department.	Member Secretary

The following persons were invited from time to time to assist the Working Group —

Shri K M. Sundaram,
Assistant Secretary,
Indian Roads and Transport Development Association,
Bombay

mt Jyoti S Patel,
ice-President, Gujarat Flying Club
aroda.

ri V P Kanetkar,
t Master General, Gujarat Circle,
medabad.

N T Taskar,
ict Manager, Telephones,
edabad

I M Joglekar,
Aerodrome Officer,
viation Department,
abad

4. At the first meeting of the Group, Sub-Groups were constituted to cover the follow subjects :—

Road Development
Road Transport
Ports, Harbours and Inland Water Transport
Tourism and the Development of Places of Archaeological Importance
Telecommunications, Railways and Civil Aviation.

5. Apart from the meetings of the Sub-Groups and of the Chairman with the Mem Secretaries, the Working Group, as a whole, held meetings on the 26th August 23rd Septen and 4th November, 1971 when the general approach to the problem and the draft rep prepared by the Sub-Groups from time to time were discussed.

6. I place on record my grateful thanks to the Sub-Groups for the work done by th and particularly to the special invitees as well as to the members of the Advisory Bodies Ports and Tourism whose advice at all stages has been of great value. The Member-Secre of the Group and the Secretaries of the Sub-Groups have worked hard to complete difficult task within the time allotted. I am thankful for their assistance.

Gandhinagar,
14th November, 1971.

K. T. SATARAWALA
Chairman

Since the above was written, I have shown the Report on Tourism and the Developn of Places of Archaeological Importance as well as that on Civil Aviation to Mr. John Seeki former Editor of the Aeroplane and Flight and now Editor of the ABC Airways Gu London. He was in Ahmedabad recently on his way to the Pacific Area Travel Associa (PATA) Conference at Kuala Lumpur and has, after going through the proofs of the Repc made some very valuable suggestions based on his long experience ranging over the whole wc of tourism. These suggestions have been incorporated in the Reports. I acknowle gratefully the assistance so readily given by Mr. Seekings despite his very busy programme Ahmedabad.

Gandhinagar,
25th January, 1972.

K. T. SATARAWALA

Report of the Working Group on Transprot and Communications

Part - I

Road Development

CHAPTER I

INTRODUCTION

1.1 History

Ancient roads were mostly trails or tracks. They were predominantly for migrations or movements of armies of conquest and for running [illegible] routes catered to the needs of pilgrims. In those days, a village was a self-sufficient unit [illegible] people were content to live in and subsist by the products of the village. [illegible] was nominal. The only known instruments of transport were bullock carts or horses [illegible] therefore, Kuchha tracks and only important routes were provided with a hardened surface. During the times of the Moghals, there was some improvement in the communication system and important roads were constructed with gravel or kankar surface. In the pre-independence period, roads were poorly developed and there was nothing like an integrated road development. There were many princely States in Gujarat with little co-ordination in road development with the result that there were no through roads and many missing links and [illegible].

1.2 First Integrated Road Development Plan of India (Nagpur Plan)

1.2.1 A start in the direction of preparation of a long term plan for roads was made in the year 1943 when the Highway Chief Engineers of India evolved the first twenty year Road Development Plan commonly known as the "Nagpur Plan". The Nagpur Plan period was considered to have been over on 31st March, 1961. All India and Gujarat State figures for the Nagpur Plan targets and actual achievements are as under

All India Figures

Sr. No.	Classification	Nagpur Plan targets (miles)	Length existing in 1951 (miles)	Length existing in [illegible] (miles)
1	Major Roads (National Highways, State Highways and Major District Roads)	1,23,000	[illegible]	[illegible]
2	Minor Roads (Other District Roads and village Roads)	[illegible]	[illegible]	[illegible]
	Total	[illegible]	[illegible]	[illegible]

NOTE.—Information regarding [illegible]

Gujarat State Figures

Sr. No.	Classification	[illegible]	[illegible]	[illegible]
1	Major Roads (National Highways, State Highways and Major District Roads)	[illegible]	[illegible]	[illegible]
2	Minor Roads (Other District Roads and village Roads)	[illegible]	[illegible]	[illegible]
	Total	[illegible]	[illegible]	[illegible]

1.2.2 It will be seen from the above figures that while India as a whole exceeded the targets of Nagpur Plan by 36 per cent, Gujarat remained in deficit by 42 per cent at the end of the Nagpur Plan period.

1.2.3 It is interesting to note that while India started with a deficit of 33 per cent in the Nagpur Plan targets, Gujarat had a deficit of 81 per cent at the start. The all India target for the Nagpur Plan was 16 kms. per 100 sq. kms. while that for Gujarat was 21 kms. per 100 sq. kms.

1.2.4 It is also worthwhile to note that while the all India figure of road kilometreage stood at 12 kms. per 100 sq. kms. at the start of the post-independence period, Gujarat had only 4 kms. per 100 sq. kms. of area. It has been assessed that in the post-independence period while the all India achievement of road construction was 0.7 km. per year per 100 sq. kms. that for Gujarat was 0.6 km. per 100 sq. kms., *i. e.*, almost on par with all India which goes to prove that although Gujarat's efforts in the post-independence period did not lag behind, it was the orginal chasm at the start of the Nagpur Plan and also the highly substandard nature of the existing roads which were responsible for the heavy deficit at the end of that Plan. At the end of the Nagpur Plan, figures of achievements stood at 21.7 kms. for 100 sq. kms. of area for all India and 12.4 kms. for 100 sq. kms. for Gujarat.

1.3 Second Integrated Road Development Plan of India (1961-81)

1.3.1.1 As the Nagpur Plan neared its end in 1961, the Chief Engineers and other concerned officers of the States and of the Department of Transport, Government of India met in a Conference in the year 1957 and prepared the next 20 years' Road Development Plan for India for the period 1961-81 and presented it to the Department of Transport, Ministry of Transport and Communications, Government of India. This road plan reviews the up-to-date position in regard to the achievements in the field of road construction with reference to and since the formulation of the Nagpur Plan and lays down targets to be achieved in a 20 year period, *i. e.*, by end of 1981. This road plan lays down a comprehensive formula for arriving at the kilometreage required for National Highways., State Highways, Major District Roads, Other District Roads and Classified Village Roads for any given unit of area by giving weightage to the following basic factors :—

(*i*) Developed and agricultural area.

(*ii*) Semi-developed area.

(*iii*) Undeveloped and uncultivable area.

(*iv*) Number of towns with population over 1,00.000.

(*v*) Number of towns with population between 1,00,000 and 50,000.

(*vi*) Number of towns with popultion between 50,000 and 20,000.

(*vii*) Number of towns with population between 20,000 and 10,000.

(*viii*) Number of places with population between 10,000 and 5,000.

(*ix*) Number of places with population between 5,000 and 2,000.

(*x*) Number of places with population between 2,000 and 1,000.

(*xi*) Number of places with population between 1,000 and 500.

(*xii*) Number of places with population below 500.

(*xiii*) Allowance (assumed as 5 per cent for future development and other unforseen factors).

... the above, the following other important factors have also ... in formulating the Twenty Year Plan :—

(1) Location of administrative headquarters, places of pilgrimage, health res... tourist centres, universities and cultural centres.

(2) Location of industries, important commercial centres, big railway junctions a... ports.

(3) The strategic needs of the country.

1.3.1.3 The objective of 1961-81 Road Plan is to provide a network of highways as under:—

(i) to provide 32 kms. of roads per 100 sq. kms. of area on an average ;

(ii) to bring every village—

(a) in a developed and agricultural area, within 6 kms. of a metalled road and 2 kms. of any road,

(b) in a semi-developed area within 12 kms. of a metalled road and 4 kms. of any road, and

(c) in an undeveloped and uncultivable area within 18 kms. of a metalled road and 7.5 kms. of any road.

1 3.2 Gujarat State entered the Twenty Year Plan (1961-81) period with Nagpur Plan deficit of 42 per cent. The Public Works Department of Gujarat State prepared the Road Development Plan of the State for the period 1961-81 on the basis of the principles laid down in the All India Road Development Plan (1961-81) prepared by the Chief Engineers The kilometreage targets for India and Gujarat as set out in the above Plan are as under:—

Sr. No.	Category	Target of Kilometreage on 31st March, 1981	
		India	Gujarat
(a)	*Main Roads*		
1.	National Highways	51,520	3,602
2.	State Highways	1,12,700	6,168
3.	Major District Roads	2,41,500	14,382
	Total ..	4,05,720	24,152
(b)	*Other Roads*		
4	Other District Roads	2,89,800	16,441
5	Classified Village Roads	3,62,250	17,035
	Total ..	6,52,050	33,476
	Grand Total ..	10,57,770	

1.3.3 In order to get to the average target of 32 kms. of roads per 100 sq. kms. of area in the (1961-81) Twenty Year Road Plan, the kilometreage target of India as a whole is required to be increased from 7,09,407 to 10,57,770 kms., *i. e.*, almost by 49 per cent whereas the kilometreage target of Gujarat State is required to be increased from 22,628 kms. to 57,628 kms., *i. e.*, by 150 per cent. Thus, in order to achieve the kilometreage target of 57,628 kms., it would be necessary to construct 34,999 kms. of roads during the Twenty Year Plan period. The approximate cost of providing network of roads as per Twenty Year Plan worked out to Rs. 297.00 crores in 1961.

1.3.4 According to actual operation, the Twenty Year Plan (1961-81) period can be spilt up as under :—

(1) Period 1961-66. Third Five Year Plan.

(2) Period 1966-69. Three Annual Plans.

(3) Period 1969-74. Fourth Five Year Plan.

(4) Period 1974-79. Fifth Five Year Plan.

(5) Period 1979-81. This period will be covered in the first two years of the Sixth Five Year Plan.

1.3.5 The Twenty Year Road Plan estimates include provision for asphalting major roads and the provision of hard surface rural roads. Looking to the trend of the development of the passenger/goods transport, it is necessary to provide all weather asphalted surface rural roads. Moreover, as pointed out in paragraph 1.3.1.3 above, villages will not be connected by all weather roads right up to the village site. Therefore, keeping in view the rate of development of passenger transport service which is aiming to provide bus services right up to village sites in the whole of the State, it is proposed to provide all weather asphalted roads right up to the village site of each village in the State. This will be over and above the Twently Year Road Plan provision. This additional work will be carried over beyond 1981 with the target to complete it by 1984.

1.3.6. Tables showing the number of towns and villages in Gujarat classified according to population groups are kept at Appendices "A" and "B".

1.4 Achievements of the Earlier Plans and Targets of the Fourth Plan

1.4.1 Roads

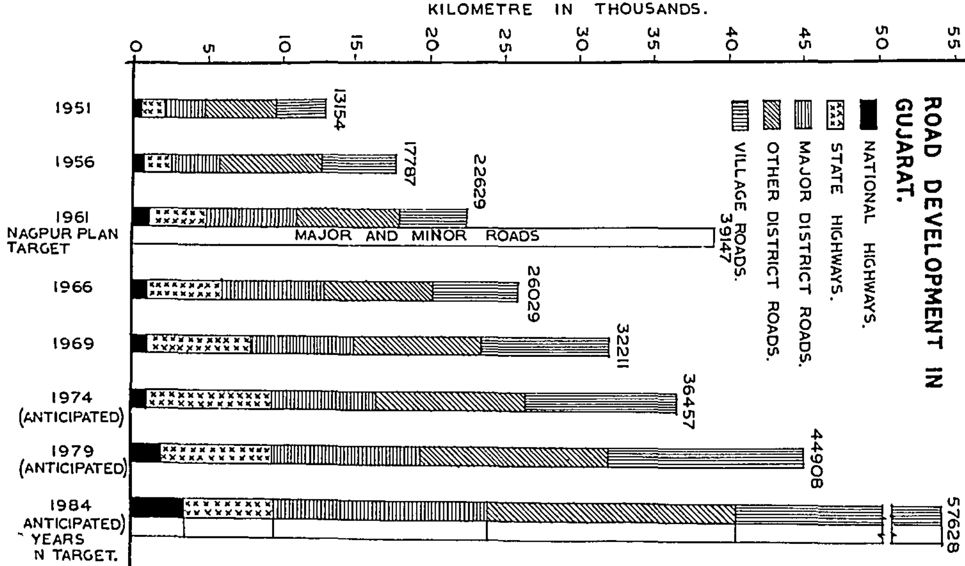
1.4.1.1 The progress achieved on the various categories of roads during various Five Year Plans up to March, 1970, along with targets during the remaining years of the Fourth Plan for Gujarat State are given in Appendices mentioned below:—

Chart.—This gives category-wise road kilometreage constructed during various Five Year Plans including three Annual Plan periods and up to March, 1970, the first year of the Fourth Plan and targets during the remaining period of the Fourth Plan.

Appendix "*C-1*"—District and region-wise break-up of the various categories of roads constructed up to March, 1970.

Appendix "*D*"—District-wise and region-wise break-up of roads constructed at the end of the Nagpur Plan and up to March, 1970 and their percentage deficit as per Nagpur Plan and the Twenty Year Plan.

Appendix '*E*'-District-wise and region-wise expenditure incurred on roads during various Five Year Plans up to March, 1970.


ROAD DEVELOPMENT IN GUJARAT.
KILOMETRE IN THOUSANDS.
0
5
10
15
20
25
30
35
40
45
50
55
NATIONAL HIGHWAYS.
STATE HIGHWAYS.
MAJOR DISTRICT ROADS.
OTHER DISTRICT ROADS.
VILLAGE ROADS.
1951
13154
1956
17787
1961
22629
NAGPUR PLAN TARGET
MAJOR AND MINOR ROADS
39147
1966
26029
1969
32211
1974 (ANTICIPATED)
36457
1979 (ANTICIPATED)
44908
1984 ANTICIPATED)
YEARS
N TARGET.
57628

It will be seen from the above that by March, 1970 Gujarat had 33,333 kms. of roads constructed against the target of 39,147 kms. of the Nagpur Plan and 57,628 kms. of roads of the Twenty Year Plan.

Targets of the Fourth Five Year Plan

1.4.1.2 The Study Group on Transport and Communications appointed for the Fourth Plan recommended Rs. 45.00 crores for Road Development.

As against this recommondation of Rs. 45.00 crores the total outlay for road development sanctioned under various schemes in the Fourth Plan is as under :—

Sr. No.	Item	Financial targets (Rs. in crores)	Physical targets (in kms.) (including improvements to the existing roads)
1	Normal programme ..	22.00	3,043
2	Selected district level schemes ..	7.50	1.159
3	Roads in economically backward talukas ..	0.16	71
4	Roads of inter-State and economic importance ..	1.53	97
5	Roads in chronically drought affected areas ..	3.75	1,475
6	Roads in Mahi-Kadana sector development ..	4.23	974
		39.17	6,819

Progress.—Against the above allocations, expenditure incurred for road development is as under:—

Sr. No.	Item	1969-70 and 1970-71 Expenditure (provisional) (Rs. in lakhs)	1969-70 and 1970-71 Probable kilometreage constructed	1971-72 Provision (Rs. in lakhs)	1971-72 Anticipated kilometreage to be constructed
1	2	3	4	5	6
1	Normal programme ..	785.47	2,398	405.00	1,289
2	Selected district level schemes ..	234.66		150.00	
3	Roads in economically backward talukas.	8.76		6.46	
4	Roads of inter-State and economic importance.	..	..	50.50	32
5	Roads in chronically drought affected areas	140.00	586	120.25	503
6	Roads in Mahi-Kadana areas ..	71.44	161	80.00	193
	Total ..	12,40.33	3,145	812.21	2,016

It may be stated that the schemes relating to roads in chronically drought affected areas and in Mahi-Kadana area development started only in 1970-71 and hence no expenditure is incurred in the year 1969-70 under these schemes.

1.4.2 Bridges

1.4.2.1 Bridges are an essential part of road development of any region. It is obvious that without construction of bridges at river and nalla crossings, the utility of our roads would be severely restricted. They would be serving their purpose only during the fair season at the most dislocating communications during the monsoon period.

1.4.2.2 During the last ten years (1961-70), the State has constructed various types of bridges ranging from simply supported R. C. C. slabs to prestressed concrete bridges.

1.4.2.3 Information regarding the number of bridges constructed and the expenditure incurred thereon during various plan periods is given in the table below:—

(Rs. in lakhs)

Works completed	During First Five Year Plan (1951-56)		During Second Five Year Plan (1956-61)		During Third Five Year Plan (1961-66)		New works and works in progress at the end of Third Five Year Plan	
	No.	Cost	No.	Cost	No.	Cost	No.	Cost
Major Bridges on State Roads	52	185	80	285	97	440	123	862
Major Bridges on National Highways.	6	28	16	102	19	95	12	209
Total ..	58	213	96	387	116	535	135	1,071

The Fourth Five Year Plan (1969-74) provides for an expenditure of about Rs. 870 lakhs on about 164 bridges in the State.

1.4.3 Some of the bright spots of achievements made to date in the field of road and bridge construction in Gujarat are listed below:—

(i) In 1961, deficiency of road kilometreage compared to Nagpur Plan was 42 per cent which is reduced to 15 per cent in 1970.

(2) National Highway No. 8 connecting Ahmedabad with Bombay was in a very bad condition in 1960. Today, it is a good road having two traffic lanes from Ahmedabad to Navsari and a single lane in the remaining few kilometres on which work of widening to two lanes is in progress.

(3) National Highway No. 8-A, connecting Ahmedabad with Kandla had several missing links in 1960. To-day, there is a good all-weather two lane road right from Ahmedabad to Kandla.

(4) In 1960, some of the district headquarters were not connected with State Capital by pucca roads and connecting taluka headquarters with district headquarters could not be thought of. To-day, out of 19 district headquarters, 12 are connected with Ahmedabad by two lane roads and the remaining with single lane pucca all w a er roads. Out of 174 taluka places, 170 are connected with district headquarters by s.

(5) Eastern State Highway starting from Vapi in Bulsar
Dharampur, Mandvi, Netrang, Bodeli, Godhra, Lunawada,

National Highway No. 8 near Raighad in Sabarkantha district having 467 kms. in length is practically completed except in a few sections, where work is expected to be completed shortly.

(6) Coastal State Highway starting from Lakhpat in Kutch district and connecting most of the ports of Gujarat viz., Koteshwar, Mandvi, Mundra, Kandla, Jodia, Okha, Dwarka, Porbandar, Veraval, Bhavnagar, Cambay, Dahej, Surat, Magdalla, Billimora, Narol, Sanjan, etc., having length of about 1,752 kms., is planned after formation of the Gujarat State and priority is assigned to this road. To-day, the road exists in about 805 kms. with pucca surface and work is in progress on about 403 kms. of roads.

(7) In an attempt to make the State Transport Routes fit for all weather use, the State Government launched a programme for construction of culverts on State Transport Routes since 1960 from plan allocation for Road Development Schemes and a number of routes are made fit for monsoon traffic on which buses had earlier to be suspended during the monsoon.

(8) The maximum laden weight allowed for vehicles on most of the important roads was 8,618 kg. in 1960 which is now increased to 2,0410 kg. for two axled vechilcles and 34,020 kg for three axled vehicles. Thus, two and half times heavier vehicles are running to-day on Gujarat roads than in 1960

(9) Engineering Research Institute at Baroda and a number of field laboratories are established and road construction is now carried out more scientifically and with effective quality control.

(10) About 39,194 vehicles were running on roads in Gujarat in 1960. The number has now increased to about 1,44,122 in March, 1970. This is attributed to the increased facilities on account of road development.

(11) After 1951, i. e., start of the First Five Year Plan altogether 405 new bridges have been constructed in Gujarat up to March, 1970 and provision for 164 more bridges is made in the Fourth Plan.

Gujarat's Position in India

.5.1 The position of roads as constructed in Gujarat vis-a-vis the whole of India is as :—

Category of Roads	India		Gujarat		
	Target of Twenty Year Plan	Achievement up to March 1960	Target of Twenty Year Plan	Achievement up to March 1960	Achievement up to March 1970
2	2	3	4	5	6
Major Roads					
) National Highways	51,520	23,960	3,602	1,033	1,050
) State Highways ..	1,12,700	72,972	6,168	5,125	8,003
Major District Roads	2,41,500	1,24,605	14,382	7,132	6,599
	4,05,720	2,21,537	24,152	13,290	15,658
nor Roads					
Other District Roads	2,69,800	1,37,048	16,441	7,065	8,532
Village Roads ..	3,62,250	4,76,180	17,033	5,674	9,143
	6,32,050	6,13,228	33,476	12,739	17,675
Total ..	10,37,770	8,34,765	57,628	26,029	33,333

It may be stated that the schemes relating to roads in chronically drought affected areas and in Mahi-Kadana area development started only in 1970-71 and hence no expenditure is incurred in the year 1969-70 under these schemes.

1.4.2 Bridges

1.4.2.1 Bridges are an essential part of road development of any region. It is obvious that without construction of bridges at river and nalla crossings, the utility of our roads would be severely restricted. They would be serving their purpose only during the fair season at the most dislocating communications during the monsoon period.

1.4.2.2 During the last ten years (1961-70), the State has constructed various types of bridges ranging from simply supported R. C. C. slabs to prestressed concrete bridges.

1.4.2.3 Information regarding the number of bridges constructed and the expenditure incurred thereon during various plan periods is given in the table below:—

(Rs. in lakhs)

Works completed	During First Five Year Plan (1951-56)		During Second Five Year Plan (1956-61)		During Third Five Year Plan (1961-66)		New works and works in progress at the end of Third Five Year Plan	
	No.	Cost	No.	Cost	No.	Cost	No.	Cost
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(5) Eastern State Highway starting from Vapi in Bulsar district and passing through Dharampur, Mandvi, Netrang, Bodeli, Godhra, Lunawada, Modasa, etc., and joining the

National Highway No. 8 near Raighad in Sabarkantha district having 467 kms. in length is practically completed except in a few sections, where work is expected to be completed shortly.

(6) Coastal State Highway starting from Lakhpat in Kutch district and connecting most of the ports of Gujarat *viz.*, Koteshwar, Mandvi, Mundra, Kandla, Jodia, Okha, Dwarka, Porbandar, Veraval, Bhavnagar, Cambay, Dahej, Surat, Magdalla, Billimora, Narol, Sanjan, etc., having length of about 1,752 kms., is planned after formation of the Gujarat State and priority is assigned to this road. To-day, the road exists in about 805 kms. with pucca surface and work is in progress on about 403 kms of roads.

(7) In an attempt to make the State Transport Routes fit for all weather use, the State Government launched a programme for construction of culverts on State Transport Routes since 1960 from plan allocation for Road Development Schemes and a number of routes are made fit for monsoon traffic on which buses had earlier to be suspended during the monsoon.

(8) The maximum laden weight allowed for vehicles on most of the important roads was 8,618 kg in 1960 which is now increased to 2,0410 kg for two axled vechilcles and 34,020 kg for three axled vehicles. Thus, two and half times heavier vehicles are running to-day on Gujarat roads than in 1960.

(9) Engineering Research Institute at Baroda and a number of field laboratories are established and road construction is now carried out more scientifically and with effective quality control.

(10) About 39,194 vehicles were running on roads in Gujarat in 1960. The number has now increased to about 1,44,122 in March, 1970. This is attributed to the increased facilities on account of road development.

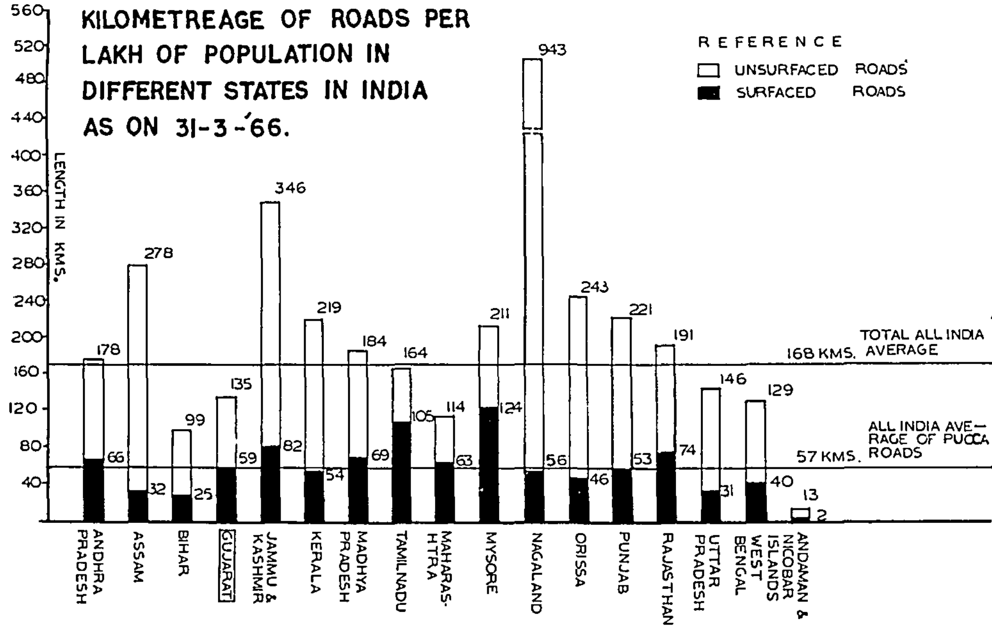
(11) After 1951, *i. e.*, start of the First Five Year Plan altogether 405 new bridges have been constructed in Gujarat up to March, 1970 and provision for 164 more bridges is made in the Fourth Plan.

1.5 Gujarat's Position in India

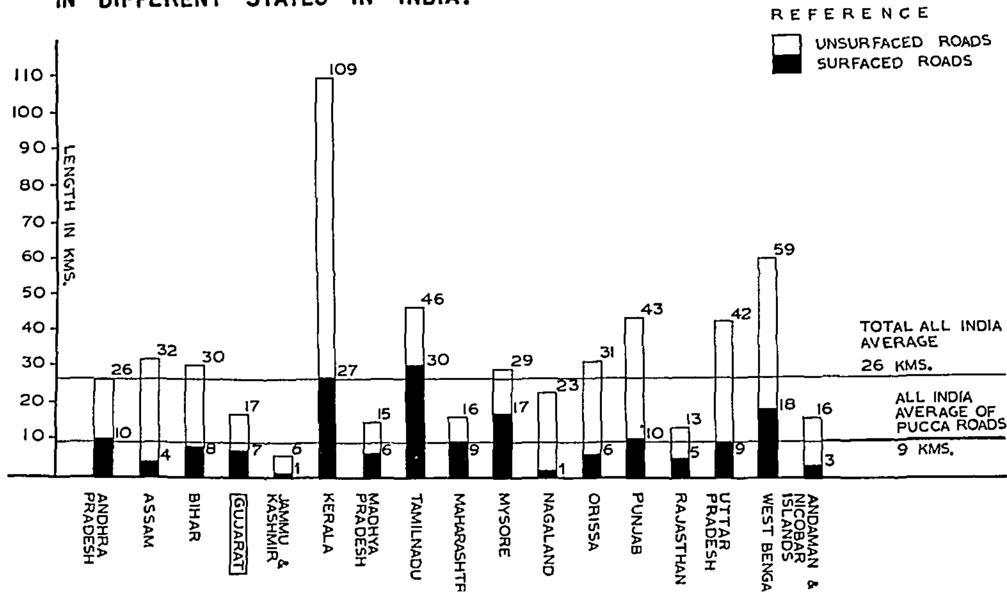
1.5.1 The position of roads as constructed in Gujarat *vis-a-vis* the whole of India is as under :—

Category of Roads	India: Target of Twenty Year Plan	India: Achievement up to March 1966	Gujarat: Target of Twenty Year Plan	Gujarat: Achievement up to March 1960	Gujarat: Achievement up to March 1970
2	2	3	4	5	6
I. *Major Roads*					
(a) National Highways	51,320	23,900	3,602	1,033	1,036
(b) State Highways	1,12,700	72,972	6,168	5,125	8,003
(c) Major District Roads	2,41,500	1,24,665	14,382	7,132	6,599
	4,05,720	2,21,537	24,152	13,290	15,658
II. *Minor Roads*					
(a) Other District Roads	2,69,800	1,37,048	16,441	7,063	8,532
(b) Village Roads	3,62,250	4,76,180	17,033	5,674	9,143
	6,32,050	6,13,228	33,476	12,739	17,675
Total	10,37,770	8,34,765	57,628	26,029	33,333

1.5.2 The position of Gujarat regarding surfaced roads and unsurfaced roads as compared to other States in India is given in the charts. As seen from the chart Gujarat State is very much in deficit in the total kilometres of roads per lakh of population as compared to average all India figures. However, the position of surfaced roads is slightly more satisfactory as Gujarat has 59 kilometres of surfaced roads per one lakh of population as compared to the all India average figures of 57 kms. for surfaced roads.



KILOMETREAGE OF ROADS PER LAKH OF POPULATION IN DIFFERENT STATES IN INDIA AS ON 31-3-'66.
REFERENCE
UNSURFACED ROADS
SURFACED ROADS
LENGTH IN KMS.
560
520
480
440
400
360
320
280
240
200
160
120
80
40
178
66
278
32
99
25
135
59
346
82
219
54
184
69
164
105
114
63
211
124
943
56
243
46
221
53
191
74
146
31
129
40
13
2
TOTAL ALL INDIA AVERAGE
168 KMS.
ALL INDIA AVERAGE OF PUCCA ROADS
57 KMS.
ANDHRA PRADESH
ASSAM
BIHAR
GUJARAT
JAMMU & KASHMIR
KERALA
MADHYA PRADESH
TAMILNADU
MAHARASHTRA
MYSORE
NAGALAND
ORISSA
PUNJAB
RAJASTHAN
UTTAR PRADESH
WEST BENGAL
ANDAMAN & NICOBAR ISLANDS



KILOMETREAGE OF ROADS PER 100 SQ. KILOMETRES AS ON 31-3-1966 IN DIFFERENT STATES IN INDIA.
REFERENCE
UNSURFACED ROADS
SURFACED ROADS
LENGTH IN KMS.
110
100
90
80
70
60
50
40
30
20
10
26
10
32
4
30
8
17
7
6
1
109
27
15
6
46
30
16
9
29
17
23
1
31
6
43
10
13
5
42
9
59
18
16
3
TOTAL ALL INDIA AVERAGE
26 KMS.
ALL INDIA AVERAGE OF PUCCA ROADS
9 KMS.
ANDHRA PRADESH
ASSAM
BIHAR
GUJARAT
JAMMU & KASHMIR
KERALA
MADHYA PRADESH
TAMILNADU
MAHARASHTR
MYSORE
NAGALAND
ORISSA
PUNJAB
RAJASTHAN
UTTAR PRADESH
WEST BENGA
ANDAMAN & NICOBAR ISLANDS

CHAPTER II

HIGHWAY TRAFFIC

2.1 Traffic Census

2.1.1 The State Public Works Department conducts Traffic Intensity Surveys on all major roads, *viz.*, National Highways, State Highways and Major District Roads in the State twice a year. Survey is conducted by an actual count of the vehicles passing through count post placed at important points along roads. The loads carried by the vehicles, the kinds of goods carried, etc., are also noted. Counts at various points give a correct idea of the extent of traffic carried on different sections of the roads and give a fair appraisal of the volume of traffic on conjested sections. Traffic intensity is calculated both in terms of the total load in tonnes carried and the number of commercial vehicles passing per day. Such traffic data helps in designing pavements of new roads and also in ascertaining the strength of existing roads when strengthening of such roads is considered.

2.1.2 Figures of traffic intensity as observed on various important roads in Gujarat for the last few years are given in Appendix F. Projections of traffic intensity for these road sections for the years 1974 and 1984 have been arrived at on the growth rate derived from the traffic intensity figures of the last few years.

2.1.3 Projected traffic intensity figures provides basic data for planning of highway capacity in terms of width as well as strength. The Working Group set up by Ministry of Transport, Government of India has recommended the following standards:—

(a) *Highway capacity equivalent.*— (private car units)	Width of the roads
(1) up to 1,000	Single lane with usual earth shoulders.
(2) up to 3,000	Single lane with improved shoulders.
(3) up to 10,000	Double lane (7 meters) carriageway.
(4) over 10,000	Four lane carriageway.

(b) *Strengthening of roads.*—The California Bearing Ratio theory of design of pavements has been generally accepted as the standard method for the structural design of roads in India. Classifications in use are:—

General Traffic Intensity	Number of heavy vehicles per day	Design curve
Light	0-15	A
	15-45	B
	45-150	C
Medium	150-450	D
Heavy	450-1500	E
	1500-4500	F

2.2 Growth of Highway Traffic

2.2.1 The State's transportation needs as it has developed in the course of the last several years has made it heavily dependent on road transport. On the one hand, the State is surplus in a commodities such as oilseeds, cotton and cotton textiles, salt, cement, etc., and on the other, it is deficient in some food grains, iron and steel, coal, etc. These are the main reasons for the generation of through traffic. The Green Revolution and rapid industrialisation have led to acceleration in the generation of traffic.

Growth of Passenger Traffic

2.2.2 The growth of passenger traffic is evident from the progress of operational results of the Gujarat State Road Transport Corporation given as under:—

Item	1955-56	1960-61	1965-66	1970-71
No. of routes	896	1,774	3,146	5,404
Route kilometres	29,361	60,817	1,36,968	3,46,014
No. of passengers carried (in lakhs) .	711	1,461	2,681	5,065

Growth of Goods Traffic

2.2.3 Progress of goods traffic can be assessed from figures of vehicles registered in Gujarat State which is as under:—

	No. of vehicles registered
1960-61	42,195
1965-66	76,411
1970-71	1,47,967

2.3 Trend of Traffic Movement

2.3.1 Regional Transport Survey Unit set up in the Bureau of Economics and Statistics in 1965-66 carried out transport survey for road, railway, airports, etc. Information given by them as under would indicate the trend of the present traffic :—

(*a*) Number of originating (from Gujarat) passengers by various modes of transport (1965-66) :—

Mode of Transport	No. of origniating Passengers (in lakhs)	Percentage to total No. of originating passengers
Rail	1,302.25	38.2
Road	2,107.30	61.8
Sea	0.29	Less than 0.1
Air	0.48	Less than 0.1

(*b*) Growth of rail and road passenger traffic from 1960-61 to 1964-65:—

	Total	Rail	Road
Annual percentage increase in the number of originating passenger traffic.	8.5	3.8	12.5
Annual percentage increase in the passenger kilometres.	9.0	6.7	15 9

Increase in the passenger kilometres was relatively greater than that of number of originating passengers indicating an increase in the average length of journey.

(*c*) An overall picture of the rail and road goods traffic (1964-65) :—

(Figres in '000 tonnes)

Mode of transportation	Inter State	Exports	Imports	Total
Rail	2,866	4,976	7,146	14,988
Road	6,425	537	608	7,570
Total	9,291	5,513	7,754	22,558

Inter-State Traffic

2.3.2 Volumes of traffic originating within the State as well as terminating into the State.

Exports.—Volume of traffic originating within the State but terminating outside the State.

Imports—Volume of traffic terminating into the State but originating outside the State.

2.3.3 The above figures show the increased trend for road traffic Reasons attributed by the Indian Roads and Transport Development Association (IRTDA) are as under:–

(*a*) Road transport renders a complete door to door service

(*b*) Two to four times faster than rail.

(*c*) No elaborate packing restriction.

(*d*) No pilferage or irksome claim settling procedures peculiar to rail transport

(*e*) Availability at short notice.

(*f*) Free from double and multiple handling.

CHAPTER III

ECONOMICS OF ROAD DEVELOPMENT

3.1 Necessity

3.1.1 If we do not pay the deserved attention to roads and road transport, we are neglecting a very potent instrument for the economic growth of the country. An acknowledged transport economist, the late Thomas H. Mc Donald of U. S. A. had stated:—

"We were not a wealthy nation when we began improving our highways, but the roads themselves helped us to create a new wealth in business, industry and land values. So, it was not our wealth that made our highways possible. Rather, it was our highways that made our wealth".

"You pay for roads whether you have them or not ; you pay more, *if* you do not have them".

It is necessary to provide the country with an efficient network of roads as quickly as possible in order that—

(1) Millions of additional job opportunities may be created.

(2) Large additional revenues may be secured to the exchequer.

(3) Green Revolution and economic development may be accelerated and national wealth increased.

(4) Benefits of modern civilization may be taken to over half a million villages.

(5) Higher living standards may be promoted.

(6) Foreign exchange may be saved.

(7) Crucial defence needs may be served.

Roads which generate their own capaital are basic to the infra-structure for the building up of our economy.

3.2 Employment Potential

3.2.1 The Planning Commission's findings show that road construction is twice as labour intensive as agriculture or housing and six times as that of small scale industries. According to the Commission's assessment and also the study conducted by the National Council of Applied Economic Research, Rs. 1,000 crores invested in roads yield employment for six million persons in roads and road transport. This is many times more than what a like investment can provide in almost any other activity. Among various fields of Government activity, roads and road transport stand unmatched in their capacity to create employment. A dose of investment yielding 19 jobs in railways or 17 in small scale industry can flood the economy with 100 jobs when it is directed into a road programme.

3.2.2 What is more, this activity does not demand any scarce skills or foreign exchange but can be carried on with the resources, technology and skills that are available with us. Such a programme, by its very nature a widely dispersed one, is of particular significance because

It means that jobs are provided to people where they are and ills of unplanned urbanisation and displacement are forestalled. Education of unemployed engineers can be put to use on a large scale in this programme.

3.2.3 Inspite of all these facts, whenever there is a cry for "economy" road programmes are the first to be axed. The observations of IRTDA in this connection are as under :—

"It is true that we have to forge ahead over a wide front. The tragedy, however, is that where scope for exercising a real choice to underwrite prolific employment decentralised in character, with massive revenue potential existed in the production of the same service, namely transport as between rail and road, our failure has been conspicuous. We adopted a liberal policy towards rail and cleared all their plans, funnelling into them scarce rupee and foreign exchange resources. But for roads, parsimony, reluctance and pruning of even the modest plan of the Chief Engineers have taken place in fixing outlays. This can be illustrated by reference to just one sector, rural roads.

The Chief Engineers wanted to devote for rural roads Rs. 1,430 crores between 1961-81. We have so far spent less than Rs. 250 crores and the Fourth Plan may at best provide Rs. 125 crores. This latter provision is less than half of the outlay suggested by the Sinha Committee on Rural Roads. The Chief Engineers' targets cannot be described as ambitious. On completion of the Plan, the ratio of rural roads to other roads will be 1 6:1. In a developed country, the rural roads system should be ten time that of other higher types of roads in length, as the Sinha Committee on Rural Roads has pointed out."

3.2.4 The Indian Road and Transport Development Association has suggested the revised allocation of public sector outlay on Transport. Table given below brings out the revised pattern of resources allocations and their impact on unemployment:—

TABLE

Public Sector Outlay on Transport and Suggested Revision

(Rs. in crores)

Programme	Fourth Plan Outlay						Suggested Revision			
	Centre	Centrally sponsored	States	Union Territories	Total	Additional employment created *	Centre	States	Total	Additional employment
Railways	1,050	..	..	..	1,050	3.20	600		600	1.60
Roads	393	25	330	72	876	18.28	720	834	1,554†	30.33
Road Transport	3	..	78	13	94	2.35	80	150	200‡	5.00
Inland Water Transport	5	4	2	2	13	0.19	9	4	13	0.19
Total	1,451	29	466	87	2,033	24.02	1,279	988	2,267	37.13

* These two columns show additional employment created in lakhs.

† Rs 1,554 crores is made up of initial Plan outlay of Rs. 876 crores, 45 % of the backlogs in road programmes as have accumulated till the Fourth Plan amounting to Rs. 550 crores and urgent schemes on our national highways indispensable for speeding up our export cargo, aggregating to Rs. 128 crores.

‡ Approximate addition of Rs. 106 crores required for replacement of passenger transport vehi[cles] in metropolitan cities.

3.3 Benefits of Road Development

3.3.1 Gains to the exchequer from roads are unmatched. In 1969-70, on a total capital cost of road system of less than Rs. 1,300 crores, road users paid, after meeting road maintenance charges, over Rs. 500 crores as taxes and duties on motor fuel, vehicles and tyres representing 40 per cent annual return on investment. Thus, after generating their own capital, roads leave huge surpluses to the exchequer.

3.3.2 Other benefits derived from a Highway Project are:—

(1) Savings in (a) Fuel and (b) Wear and Tear.
(2) Savings in fares.
(3) Savings due to reduction in accidents.
(4) Savings in administration cost.
(5) Increase in the value of agricultural production.
(6) Increase in the value of industrial production.
(7) Time saved to—(*a*) Pedestrians (*b*) Cyclists (*c*) Passengers and (*d*) Commercial vehicles.

3.3.3 Cost Benefit Study Idea

3.3.3.1 The selection of proper works and arranging them in the order of priority are the essence of the need based plan. It has been already discussed in the earlier paragraphs that the road development activity creates millions of additional job opportunities, brings additional revenue to the exchequer, accelerates the Green Revolution, increases national wealth, confers benefits of modern civilization to distant villages, promotes higher standard of living, saves valuable foreign exchange and provides crucial defence needs. Over and above these, a number of other indirect benefits are also gained. The evaluation of the above benefits in terms of money return is difficult to work out. However, it will be useful to quote here a few examples of the construction of roads as part of a cost benefit study :—

(1) The road section of National Highway 49 between Ramnad and Mandapam twenty miles in length was constructed in 1955 at an estimated cost of Rs. 1,40,000. The annual savings on transport was assessed in 1959 at Rs. 1,86,000 and increase in the value of the adjoining land by Rs. 6,84,000.

(2) In Japan, a sum of 1,90,000 million yen has been estimated as the saving in transport cost to be expected in 1971 from road works under the Five Year Plan for 1961-65 amounting to 2,100,000 million yen.

(3) In Southern Italy, 64 milliard lire were spent by the Fund for the South between 1954 and 1959 on improving 12,000 kilometres of various roads, the annual saving on transport was assessed at 16 milliard lire in 1959 increasing by 10 per cent every year.

The above examples show that the benefits gained from the construction and improvement of the roads far out-weigh the cost of their improvement and construction.

3.3.3.2 Cost benefit studies clearly show that expenditure on road development activities is more than justified by the benefits to the communities. The apparent and immediate benefits of goods and passengers traffic can be seen every year.

3.3.3.3 The number of vehicles registered in Gujarat in 1960-61 was 42,195 which has shot up to 76,411 in 1965-66 and to 1,47,967 in 1970-71. This phenomenal rise in the traffic can be solely attributed to the development of new roads and improvement of the existing roads.

Road development activity, therefore, deserves top priority.

CHAPTER IV

PERSPECTIVE PLAN 1974-84

4.1 Basic Objectives

The basic objective of the Perspective Plan 1974-84 for road development is to complete the network of roads as proposed in the Twenty Year Road Plan. However, at this stage, it is necessary to take a review of some of the targets and standards originally set while framing this Plan in the light of the developments that have occured in the last decade in the needs and nature of the roads traffic, the growing aspirations of the people, the fast accelerating tempo in agriculture and industry, the new awareness in tourism and special needs of Area Development of big Irrigation schemes, etc. Besides, therefore, providing for completing the physical and the financial targets of the Twenty Year Road Plan, an evaluation of the following additional objectives has also been made and included in the Plan to be taken up, keeping in view need based Plan :—

(1) It is estimated that even on completion of the Twenty Year Road Plan targets, 20 per cent of the villages will still remain unconnected. These villages also should be connected with the road system.

(2) To provide an all weather asphalted surface even on Other District Roads and Village Roads.

(3) To provide for the special needs of tourism, archaeology, mining, industries, ports, etc.

(4) To press the Government of India to declare additional roads as National Highways so as to increase the length of National Highways in Gujarat progressively from 1056 kms. to 3,602 kms. during the Perspective Plan period (1974-84) for achieving the Twenty Year Plan target.

(5) To move the Government of India to widen progressively the present National Highway No. 8 from Ahmedabad to Bombay which is subject to very heavy traffic from two lanes to a fourlane divided Express Highway

(6) To convert the existing level crossings on railways in municipal towns and other busy places where traffic is very heavy into over or under bridges

4.2 Needs of the State with Reference to Twenty Years Plan

4.2.1 At the end of the Fourth Five Year Plan, i. e., by 1974, 36,457 kms. of roads will be ompleted. In order to achieve the target of 57,628 kms. of roads 21,171 kms. of new roads ill have to be constructed during the period 1974-84.

4.2.2 Besides the construction of new roads as stated above, which includes construction missing links of roads and diversions of State Highways outside conjested towns, the Plan o provides for the following :—

(1) Construction of missing bridges and C. D. works.

(2) Improving and strengthening the existing weak stretches.

(3) Strengthening of weak bridges and C. D. works.

(4) Widening the important State Highways to two lane carriage way to the extent of 50 per cent.

3.3 Benefits of Road Development

3.3.1 Gains to the exchequer from roads are unmatched. In 1969-70, on a total capital cost of road system of less than Rs. 1,300 crores, road users paid, after meeting road maintenance charges, over Rs. 500 crores as taxes and duties on motor fuel, vehicles and tyres representing 40 per cent annual return on investment. Thus, after generating their own capital, roads leave huge surpluses to the exchequer.

3.3.2 Other benefits derived from a Highway Project are:—

(1) Savings in (a) Fuel and (b) Wear and Tear.
(2) Savings in fares.
(3) Savings due to reduction in accidents.
(4) Savings in administration cost.
(5) Increase in the value of agricultural production.
(6) Increase in the value of industrial production.
(7) Time saved to—(*a*) Pedestrians (*b*) Cyclists (*c*) Passengers and (*d*) Commercial vehicles.

3.3.3 Cost Benefit Study Idea

3.3.3.1 The selection of proper works and arranging them in the order of priority are the essence of the need based plan. It has been already discussed in the earlier paragraphs that the road development activity creates millions of additional job opportunities, brings additional revenue to the exchequer, accelerates the Green Revolution, increases national wealth, confers benefits of modern civilization to distant villages, promotes higher standard of living, saves valuable foreign exchange and provides crucial defence needs. Over and above these, a number of other indirect benefits are also gained. The evaluation of the above benefits in terms of money return is difficult to work out. However, it will be useful to quote here a few examples of the construction of roads as part of a cost benefit study :—

(1) The road section of National Highway 49 between Ramnad and Mandapam twenty miles in length was constructed in 1955 at an estimated cost of Rs. 1,40,000. The annual savings on transport was assessed in 1959 at Rs. 1,86,000 and increase in the value of the adjoining land by Rs. 6,84,000.

(2) In Japan, a sum of 1,90,000 million yen has been estimated as the saving in transport cost to be expected in 1971 from road works under the Five Year Plan for 1961-65 amounting to 2,100,000 million yen.

(3) In Southern Italy, 64 milliard lire were spent by the Fund for the South between 1954 and 1959 on improving 12,000 kilometres of various roads, the annual saving on transport was assessed at 16 milliard lire in 1959 increasing by 10 per cent every year.

The above examples show that the benefits gained from the construction and improvement of the roads far out-weigh the cost of their improvement and construction.

3.3.3.2 Cost benefit studies clearly show that expenditure on road development activities is more than justified by the benefits to the communities. The apparent and immediate benefits of goods and passengers traffic can be seen every year.

3.3.3.3 The number of vehicles registered in Gujarat in 1960-61 was 42,195 which has shot up to 76,411 in 1965-66 and to 1,47,967 in 1970-71. This phenomenal rise in the traffic can be solely attributed to the development of new roads and improvement of the existing roads.

Road development activity, therefore, deserves top priority.

CHAPTER IV

PERSPECTIVE PLAN 1974-84

4.1 Basic Objectives

The basic objective of the Perspective Plan 1974-84 for road development is to complete the network of roads as proposed in the Twenty Year Road Plan. However, at this stage, it is necessary to take a review of some of the targets and standards originally set while framing this Plan in the light of the developments that have occured in the last decade in the needs and nature of the roads traffic, the growing aspirations of the people, the fast accelerating tempo in agriculture and industry, the new awareness in tourism and special needs of Area Development of big Irrigation schemes, etc. Besides, therefore, providing for completing the physical and the financial targets of the Twenry Year Road Plan, an evaluation of the following additional objectives has also been made and included in the Plan to be taken up, keeping in view need based Plan :—

(1) It is estimated that even on completion of the Twenty Year Road Plan targets, 20 per cent of the villages will still remain unconnected. These villages also should be connected with the road system.

(2) *To provide an all weather asphalted surface even on Other District Roads and Village Roads.*

(3) To provide for the special needs of tourism, archaeology, mining, industries, ports, etc.

(4) To press the Government of India to declare additional roads as National Highways so as to increase the length of National Highways in Gujarat progressively from 1056 kms. to 3,602 kms. during the Perspective Plan period (1974-84) for achieving the Twenty Year Plan target.

(5) To move the Government of India to widen progressively the present National Highway No. 8 from Ahmedabad to Bombay which is subject to very heavy traffic from two lanes to a fourlane divided Express Highway.

(6) To convert the existing level crossings on railways in municipal towns and other busy places where traffic is very heavy into over or under bridges.

4.2 Needs of the State with Reference to Twenty Years Plan

4.2.1 At the end of the Fourth Five Year Plan, i. e., by 1974, 36,457 kms. of roads will be completed. In order to achieve the target of 57,628 kms. of roads 21,171 kms. *of new roads* will have to be constructed during the period 1974-84.

4.2.2 Besides the construction of new roads as stated above, which includes construction of missing links of roads and diversions of State Highways outside conjested towns, the Plan also provides for the following :—

(1) Construction of missing bridges and C. D. works.

(2) Improving and strengthening the existing weak stretches.

(3) Strengthening of weak bridges and C. D. works.

(4) Widening the important State Highways to two lane carriage way to the extent of

4.2.3 It has been felt that command areas of major irrigation schemes such as the Mahi-Kadana, Ukai-Kakrapar and Shetrunji need special attention in the matter of development of roads in the areas because it has been realised that without adequate network of roads. full impact of variegated advantages of irrigation facilities cannot be realised. Creation of irrigation facilities would lead to intensive development of agriculture and agro-industries in these areas. These would necessitate development of roads to provide infra-structu e facilities for the development of the area. The construction of roads generally follow the Twenty Year Road Plan with the expansion of the rural road system right up to village sites and their requirements would generally be covered up under the Plan except for special provision of farm roads.

4.3 Requirements of Approach Roads Connecting all Villages and Providing Asphalt Surface to all Low Grade Roads

4.3.1 With the impact of the present day life of speed and technology, the aspirations of the people even in villages are growing day by day. The Green Revolution has brought a good measure of prosperity to our country side and the stage is now set for the rural sector to play an increasingly important role as a consumer force. Not only every village now desires to be connected by a road with the rest of the world but also desires to have a smooth modernised all weather road to suit the modern means of transport such as motor cars, trucks and passenger buses.

4.3.2 On a rough estimate, it is assessed that about 80 per cent of the villages will be connected by roads on completion of Twenty Year Road Plan. This would leave about 20 per cent villages which would still remain unconnected with the road system. For connecting all the villages by roads, an additional 2,100 kms. of roads over Twenty Year Road Plan will be rquired to be constructed at an estimated cost of Rs. 17.00 crores.

4.3.3 At present, Gujarat State Road Transport Corporation plies on 60 per cent Kutcha routes. By implementing this scheme of connecting all villages, the long felt need of the Gujarat State Road Transport Corporation will be met with. This will help in reducing their operational cost, increasing operational efficiency and speed, increased fleet utilisation and all weather service and comfort to the travelling public.

4.3.4 The Twenty Year Road Plan does not envisage provision of asphalt surface to other District Roads and Village Roads. The demand for providing asphalt surface to these roads is growing. States such as Punjab and Hariyana have already taken up a programme providing asphalt surface to rural roads. If all the low grade roads constructed so far and those which will now be constructed in the Fifth and the Sixth Plans are to be provided with asphalt surface, an additional provision of Rs. 110 crores would be needed.

4.4 Special Needs of Tourism, Archaeology, Mining, Industries, Ports, etc.

Tourism

4.4.1 There is a general upsurge in tourism not only in other countries but in India as well. People like to go on tours to interesting places whenever they go on vacation. All over the world, tourism is now recognised as a mean of earning precious foreign exchange. In India, the Government has also recognised it as a form of social service necessary for the relaxation of the people. All Governments have therefore, schemes for developing tourist spots and providing facilities for stay and approach to attract home and foreign tourists, especially the latter. In India, places of pilgrimage also provide a good tourist attraction to those who like to combine recreation with the desire to visit religious places. Gujarat has a number of places of pure tourist attraction such as Nal Sarover, Lothal, Sasan Gir, Saputara, etc. and religious places such as Prabhas Patan, Dwarka, Girnar, Palitana, Gadhada, Tulsishyam, Ambaji, Shamlaji, Dakor, etc. Some of these lack good all weather approaches.

4.4.2. In Gujarat, there are about 400 protected monuments of historical and archaeological interest. These monuments also provide a good tourist attraction. A good number of them have

no pucca approach road. A list of requirements of approach roads totalling 113 kms. to these places is given in Appendix 'G'.

Industries and Mining

4.4.3 Gujarat ranks high among the industrially advanced States. The commercial crop pattern of agriculture has led to the development of consumer industries such as textiles,vegetable oil, tobacco curing and sugar, based on cotton, oil-seeds, tobacco and sugar-cane respectively. These industries are widely spread in the country side. Forest based and mineral based industires are also coming up at an increasing rate. A large oil refinery and several petro-chemical industires are established near Baroda. It will be necessary to construct suitable roads to connect big industrial complexes as well as industrial estates. Most of the mining areas are situated in the remote parts of the State where there are no adequate road facilities. It is necessary to make provision for them. Requirements of the linking roads totalling about 190 kms. for joining mining areas is given in Appendix 'H'.

4.4.4 Gujarat State has a coast line of about 1600 kms. This is about 28 per cent of the the total coast-line of India. Out of a total of 145 ports in India, 40 are in Gujarat with one major port, 11 intermediate ports and 28 minor ports. About 45 per cent of the total traffic trade of intermediate and minor ports of India is handled by such ports in Gujarat. This shows that ports in Gujarat have a high development potential and consequent increase in traffic. Requirements of roads for connecting the existing ports with the road system in the hinterland so as to provide *good transport facilities for export and import trade are also accounted for. Development of* the coastal highway on the coast-line of Gujarat has both commercial and strategic improtance. Generally, coastal areas are poor in communications. Railway communications exist only in small stretches and they have not been planned to serve these areas. This leads to the necessity of developing a highway system along the coast-line to provide the much needed communications to the coastal areas and to connect all important ports with the resultant advantages of opening up coastal regions, providing commercial links between ports and also serve the defence needs in times of crisis. Such a system will also help in anti-smuggling operations. The coastal highway would run from Lakhpat in Kutch district to Jakhau, Mundra, Mandvi, Kandla, Navlakhi, Okha, Dwarka, Porbandar, Veraval, Diu, Port Victor, Mahuva, Bhavnagar, Cambay, Dahej, Magdalla, Bulsar, Daman, and Umbergaon in Bulsar district. The total length would be about 1752 kms.

1.	Total length	1,752	kms.
2.	Road existing with black top surface	897	kms.
3.	Road existing with inferior surface	452	kms.
4.	Missing links	403	kms.
5.	Total cost of works approved and in progress up to Fourth Plan	Rs.646	*lakhs*
6.	Works in progress :		
	(a) Roads	583	kms.
	(b) Bridges	19	Nos.
7.	Amount required to complete the remaining length and improving sub-standard sections to State Highway standard.	Rs. 15	*crores*

4.5 Roadside Amenities

With the tremendous increase in road traffic of cars and buses and in the transport of goods by roads through trucks, trailers, etc., it is necessary to develop roadside amenities. These include :—

(a) Development of travellers' bungalows, motels, etc.
(b) Roadside facilities such as parking, lay-byes, canteens, toilet rooms, telephones, places with first aid equipment, drinking water and washing faci[illegible]
(c) Petrol pumps and service stations, automobile spare parts and
(d) Development of arboriculture and roadside parks.

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(c) Petrol pumps and service stations, automobile spare parts and repair shops, etc.
(d) Development of arboriculture and roadside parks.

4.6 Road Safety Measures

4.6.1 Accidents grow faster than vehicles. Accidents on highways are not without apparent causes, and considering the disasters they bring to the life and property of the persons involved in such tragic accidents, they require special attention.

4.6.2 The salient features for the proper designs of highways include road safety measures. What is required is, therefore, the proper attention to this aspect which does not require much extra cost.

4.6.3 The study of accidents have shown that they are due to the following reasons:—

(1) Human failure.
(2) Faults in machinery.
(3) Defective construction and maintenance of roads.

(1) *Human failure* (2) *Faults in machinery*:—The first two reasons can be overcome by proper training of the drivers, more facilities on highways for rest and recreation, checking of automobiles at regular intervals, facilities for repairs, patrolling on highways, etc.

(3) *Defective construction and maintenance of roads*.—The sharp bends, zig-zag curves, poor sight distance, lack of display or inadequacy of road signs, bad junctions, unmanned level crossings, deteriorated road surfaces, inadequate road width, weak structures, etc., contribute to highway accidents.

4.6.4 With the modernization of highways and coming up of more heavy and speedy vehicles, the above deficiencies will have to be fully set right to arrest a further rise in accidents.

4.6.5 It has been proposed to spend a considerable amount of funds during the Fifth and Sixth Plans to construct new roads, strengthen and improve the existing roads, etc. It should not, therefore, be difficult to look to these important aspects of the road plan which do not require much extra amount. What is required is to set right such deficiencies with allocation of funds on priority basis and the designing of road signs and markings, etc., by expert bodies such as the National Design Institute, Ahmedabad.

4.7 Financial Requirements

4.7.1.1 At the end of the Fourth Five Year Plan, *i. e.*, by 1974, 36,457 kms. of roads are expected to be completed. In order to achieve the targets of 57,628 kms. of roads, 21,171 kms. of new roads will have to be constructed during the period 1974-84. This includes 2,546 kms. of National Highways. Hence, 18,625 kms. of new State roads will have to be constructed during period from 1974-84. In addition to these, about 3,015 kms. of State Highways and Major District Roads expected to be existing at the end of the Fourth Five Year Plan will require to be provided with pucca surface. Moreover, about 2,600 kms. of State Highways will have to be widened to two-lane carriageway to cope with the expected increase in traffic.

4.7.1.2 The estimated cost for achieving target of the Twenty Year Plan by the end of 1984, will be about Rs. 236 crores as under :—

Category	Length in kms.	Amount (Rs. in crores)
1. State Highways		
(a) Improvement	590	8.85
(b) Widening to two lanes	2,600	39.00
		47.85

Category	Length in kms.	Amount (Rs. in crores)
2. Major District Roads		
(a) New Roads	4,959	61.9
(b) improvements	2,425	24.2
		86.23
3. Other District Roads		
New Roads	6,624	66.24
		66.24
4. Village Roads	7,047	35.23
		235.55

This amount will be required to fulfil the targets and standards laid down in the original Twenty Year Plan. Say, Rs. 236.00 crores.

4.7.2 Additional funds will be required for other objectives mentioned at para 4.1 as under :—

		(Rs. in crores)
1.	To connect the remaining 20 per cent villages by pucca all weather roads	
2.	To provide asphalt surface to all low grade rural roads	17.00
3.	To provide additional infra-structure facilities for major irrigation projects	110.00
4.	To provide additional roads for tourism and archaeology	10.00
5.	To provide additional roads for industries and mines	2.00
6.	To provide additional roads for ports and harbours	4.00
7.	To provide roadside amenities, roadsafety measures, research training and other unforeseen items.	2.00
8.	To replace existing busy level crossings by over/under bridges	5.00

National Highways Requirement (Central Sector)

1. Increasing the length of the National Highways from [illegible] 3602 kms. and to widen and strengthen the existing [illegible] National Highway standard.
2. Converting the existing National Highway [illegible] Gujarat-Maharashtra border from [illegible] Highway.

4.8 Recommended Provisions in the Fifth and Sixth Five Year Plans to Achieve Targets for the Need Based Plan

4.8.1 The total requirement of funds will work out as under :–

	(Rs. in crores)
1. To achieve targets of the Twenty Year Plan ..	236.00
2. Additional requirement of funds for other objectives mentioned at para 4.7.2 above.	155.00
	391.00

Say, Rs. 390.00 crores

Suggested provisions in the Fifth and Sixth Five Year Plans will be as under :—

	(Rs. in crores)
1. Fifth Five Year Plan	130.00
2. Sixth Five Year Plan	260.00
Total ..	390.00

4.8.2 If only Rs. 80.00 crores, *i. e.*, twice the allocation of Fourth Plan and Rs. 160.00 crores for Sixth Plan are made available, it will not be possible to achieve the targets of the need based Plan and there will be a very heavy spill over of works costing over Rs. 150 crores.

CHAPTER V

IMPLEMENTATION

5.1 Organisation

5.1.1 To implement any well balanced plan, an equally well knit organisation [illegible] necessary. The road development requirements of the future years have been worked o[ut] in the previous chapters. The execution of the road works according to the plan wi[ll] depend upon efficient organisation at different levels. It is felt that the present P. W. D. set-up will have to be re-organised and strengthened at all levels to achieve the targets of the Plan

5.1.2 Appendix 'I' shows the requirements of the Road divisions for the Fifth and Sixth Five Year Plans. This will be the minimum requirement. The requirement is so high that this Group feels that a separate Highway Department be created. This Department will look after the work of highway planning, execution and maintenance. All the allied problems concerning the highways in the State shall be dealt with by this department. This will give a great fill up to highway planning and execution and will go a long way in achieving the targets set in the Plan.

5.1.3 Separate units as described below will also have to be created :—

(A) Headquarters

(*i*) Separate unit for investigation, survey and project preparation for roads under a Superintending Engineer on the line of Superintending Engineer, Designs, with project divisions in the field located at convenient places.

(*ii*) A separate unit for the designs of bridges and standardisation on the same line as the one existing today but only for highway bridges and allied matters.

(*iii*) A separate unit for the work of statistical data collection, progress reporting, evaluation and traffic studies. The small statistical cell working at present to be strengthened suitably with some staff attached to the divisions.

(B) Field Set-up

The present set-up may be expanded as the workload increases. The surveying and planning units should be reinforced well in advance so that a sufficient number of projects can be kept ready at the time of commencement of the Plan. Similarly, separate divisions exclusively for maintenance should be created whenever justified.

It is the experience that when the number of works to be executed is [illegible] particular area, good contractors are either not available or the rates quoted [illegible] high. It is, therefore, necessary that some works are executed departmentally [illegible] this separate divisions with special staff should be opened. These divisions will have [illegible] powers also.

5.2 Training and Research

5.2.1 Experience has shown [illegible] late, even labour shortage is felt. [illegible] targets. The materials required for the [illegible] bridges [illegible]

certain parts of the State. The result is that they cost more and ultimately works become costly and cause great strain on the limited Plan resources.

5.2.2 Government provides the maximum possible amount for the works under P.W.D. and these works are also costly. Proper guidance in use of the scarce materials or their substitution by locally available cheaper materials will result in considerable saving. This can be achieved by properly training the staff and also by research.

5.2.3 There is one Engineering Research Institute at Baroda under a Director. There are sub-centres at Rajkot, Surat, Ahmedabad and Bhuj. This Institute carries out experiments and tests to find out the workability, suitability and the strength of the materials. They also make useful suggestions for the proper use of materials which may prove to be economical. They also study the problems arising during the execution of the works and suggest solutions. This Institute undertakes research both for highways and irrigation problems. To cope with the likely increased tempo of works in the coming years as envisaged in the Plan, the Group feels that a separate Highway Research Institute be set up at a convenient central location with sub-centres at important places in the State for site investigation and study.

5.2.4 For the execution of the large number of works as envisaged in the Plan, Government will have to employ a large number of technical personnel. They will be handling works worth lakhs of rupees. In order that they can handle these works confidently and efficiently in the shortest possible time, they will have to be properly trained. The technical eduction received by them at the colleges is mainly on the theoretical side. They will have to know administrative and accounting procedures, latest technique in the field of construction, etc. Government has recently opened a Staff College which will impart training to the staff and ready them for the works they are to handle. This Institution will have to be suitably strengthened in the future.

5.2.5 Government from time to time deputes officers for training in foreign countries under the Colombo Plan and other schemes. Such training has been found to be useful as the officers get first-hand knowledge about the latest methods, techniques and practices followed in other countries which helps in adoption of such techniques here and make the projects economical. Government should take full advantage of such schemes and depute as many officers as possible so that most of them can have advantage of knowing the latest developments in the field.

5.3 Equipment and Machinery

5.3.1 Attention is also required to be paid for planning and procurement of the right type of machinery and equipment so that the projects to be undertaken can be executed as per schedule with proper quality control. Mechanisation of certain activities will have to be done to ward off labour shortage, if any, in future and to speed up the works.

5.3.2 Road Marketing Machinery

The machinery required for road work can be divided into the following two categories :—

(1) Essential equipment necessary for use with manual labour. This would consist of—

(*i*) Road rollers.
(*ii*) Air compressors and drills.
(*iii*) Stone crushers and granulators.
(*iv*) Soil pulverising and mixing equipment for soil stabilisation works.
(*v*) Tar boilers, sprayers and asphalt mixers.
(*vi*) Concrete mixers and vibrators.
(*vii*) Water tankers and trucks.

(2) Special equipment can economically supplement manual labour in situation where speed, urgency and rigid observance of high specifications are the essential factors. Earth moving units for heavy embankment, continuous hot-mix asphalt plant, pavers and other similar equipment will fall in this category.

The rough estimate of the requirement of machinery and equipment for the implementation of Fifth and Sixth Five Year Plans is given in Appendix J.

5.3.3. A separate Mechanical Circle under the charge of a Superintending Engineer looks after planning, procurement, operation and maintenance of machinery. At present, this set-up is combined for the Roads and Irrigation wings. Looking to the future needs of machinery a separate mechanical set-up for Highways is considered necessary. This can be built up as the works gather tempo.

5.3.4 The shortage of road materials such as stone-metal, kapchi, grit, etc. is felt often. With the increase in the tempo of work, this shortage is likely to continue. It is necessary to open Government quarries at different places so that sufficient and good quality material is available when required and the prices are effectively controlled.

5.4 Collection of Statistical Data

5.4.1 It has been accepted that the collection of reliable statistical data is essential for planning in any field. The extent of success of the plan depends mostly upon the degree of accuracy of the collection of this data. In road planning, the most important data to be collected pertains to traffic movement. The study of the flow of traffic helps in assigning the priorities and in the selection of works. At present, there is a Statistical Section in P. W D which collects and maintains such data. This section will need strengthening to cope with the future work. The Group feels that a Cell be opened in the department to collect the required data regularly and to study the trends of traffic and to make useful suggestions from time to time. This Cell can also help in the study of roadside accidents, their causes and the remedies. At divisional level also some staff is required to be posted who will collect all the required data and transmit them to the Central Cell. This will help in timely collection and proper compilation of data. The processing of these data will, increasingly, have to be by electronic data processing (EDP).

5.5 Road Maintenance

5.5.1 The work of the engineers and the Department does not cease with the construction of new roads. Like any other new creation, the road has also to serve the purpose for which it is built. Roads, therefore, require proper maintenance and repairs to serve the needs of the traffic. Experience has shown that a sufficient allotment is hardly made for the maintenance and repairs to roads. Apart from discomfort to the those using the roads, roads in poor condition make the cost of road transport operations-uneconomical.

5.5.2 The estimated requirements and the amount made available for the maintenance of roads for the last few years is given below :—

(Rs in lakhs)

Year	Kilometreage to be maintained	Amount required	Amount made available
1965-66	24,995	394.00	275 00
1966-67	26,409	412.00	256 00
1967-68	28,503	433.00	321 00
1968-69	31,155	459.00	683 00*
1969-70	32,271	485 00	661 00*

*...uding flood damaged repairs.

certain parts of the State. The result is that they cost more and ultimately works become costly and cause great strain on the limited Plan resources.

5.2.2 Government provides the maximum possible amount for the works under P.W.D. and these works are also costly. Proper guidance in use of the scarce materials or their substitution by locally available cheaper materials will result in considerable saving. This can be achieved by properly training the staff and also by research.

5.2.3 There is one Engineering Research Institute at Baroda under a Director. There are sub-centres at Rajkot, Surat, Ahmedabad and Bhuj. This Institute carries out experiments and tests to find out the workability, suitability and the strength of the materials. They also make useful suggestions for the proper use of materials which may prove to be economical. They also study the problems arising during the execution of the works and suggest solutions. This Institute undertakes research both for highways and irrigation problems. To cope with the likely increased tempo of works in the coming years as envisaged in the Plan, the Group feels that a separate Highway Research Institute be set up at a convenient central location with sub-centres at important places in the State for site investigation and study.

5.2.4 For the execution of the large number of works as envisaged in the Plan, Government will have to employ a large number of technical personnel. They will be handling works worth lakhs of rupees. In order that they can handle these works confidently and efficiently in the shortest possible time, they will have to be properly trained. The technical eduction received by them at the colleges is mainly on the theoretical side. They will have to know administrative and accounting procedures, latest technique in the field of construction, etc. Government has recently opened a Staff College which will impart training to the staff and ready them for the works they are to handle. This Institution will have to be suitably strengthened in the future.

5.2.5 Government from time to time deputes officers for training in foreign countries under the Colombo Plan and other schemes. Such training has been found to be useful as the officers get first-hand knowledge about the latest methods, techniques and practices followed in other countries which helps in adoption of such techniques here and make the projects economical. Government should take full advantage of such schemes and depute as many officers as possible so that most of them can have advantage of knowing the latest developments in the field.

5.3 Equipment and Machinery

5.3.1 Attention is also required to be paid for planning and procurement of the right type of machinery and equipment so that the projects to be undertaken can be executed as per schedule with proper quality control. Mechanisation of certain activities will have to be done to ward off labour shortage, if any, in future and to speed up the works.

5.3.2 Road Marketing Machinery

The machinery required for road work can be divided into the following two categories :—

(1) Essential equipment necessary for use with manual labour. This would consist of—

(*i*) Road rollers.
(*ii*) Air compressors and drills.
(*iii*) Stone crushers and granulators.
(*iv*) Soil pulverising and mixing equipment for soil stabilisation works.
(*v*) Tar boilers, sprayers and asphalt mixers.
(*vi*) Concrete mixers and vibrators.
(*vii*) Water tankers and trucks.

(2) Special equipment can economically supplement manual labour in situation where speed, urgency and rigid observance of high specifications are the essential factors. Earth moving units for heavy embankment, continuous hot-mix asphalt plant, pavers and other similar equipment will fall in this category.

The rough estimate of the requirement of machinery and equipment for the implementatio[n] of Fifth and Sixth Five Year Plans is given in Appendix J.

5.3.3. A separate Mechanical Circle under the charge of a Superintending Engineer looks after planning, procurement, operation and maintenance of machinery. At present, this set-up is combined for the Roads and Irrigation wings. Looking to the future needs of machinery a separate mechanical set-up for Highways is considered necessary. This can be built up as the works gather tempo.

5.3.4 The shortage of road materials such as stone-metal, kapchi, grit, etc is felt often. With the increase in the tempo of work, this shortage is likely to continue. It is necessary to open Government quarries at different places so that sufficient and good quality material is available when required and the prices are effectively controlled.

5.4 Collection of Statistical Data

5.4.1 It has been accepted that the collection of reliable statistical data is essential for planning in any field. The extent of success of the plan depends mostly upon the degree of accuracy of the collection of this data. In road planning, the most important data to be collected pertains to traffic movement. The study of the flow of traffic helps in assigning the priorities and in the selection of works. At present, there is a Statistical Section in P. W. D. which collects and maintains such data. This section will need strengthening to cope with the future work. The Group feels that a Cell be opened in the department to collect the required data regularly and to study the trends of traffic and to make useful suggestions from time to time. This Cell can also help in the study of roadside accidents, their causes and the remedies. At divisional level also some staff is required to be posted who will collect all the required data and transmit them to the Central Cell. This will help in timely collection and proper compilation of data. The processing of these data will, increasingly, have to be by electronic data processing (EDP).

5.5 Road Maintenance

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5.5.2 The estimated requirements and the amount made available for the maintenance of roads for the last few years is given below :—

(Rs. in lakhs)

Year	Kilometreage to be maintained	Amount required	Amount made available
1965-66	24,995	[illegible]	[illegible]
1966-67	26,409	[illegible]	[illegible]
1967-68	[illegible]	[illegible]	[illegible]
1968-69	[illegible]	[illegible]	[illegible]
1969-70	[illegible]	[illegible]	[illegible]*

*...uding flood damaged repairs.

It is estimated that the amount of Rs. 673.00 lakhs per year, *i. e.*, Rs. 3365.00 lakhs will be required in the Fifth Plan for maintenance of roads.

Similarly, Rs. 850.00 lakhs will be required per year, *i. e.*, Rs. 4250.00 lakhs will be required in the Sixth Plan for maintenance of roads.

5.5.2.2 Government has laid down the standard for the repairs and maintenance of the road on mileage basis as under but lack of funds do not permit even this normal scale :—

Surface of the road		Rates of maintenance per kilometre Rs.
1. C. C. or B. T. surface	..	2,734
2. W. B. M. surface	..	2,050
3. Muram Kankar Earth	..	410

For want of funds, the roads could not be maintained properly resulting in dissatisfaction and annoyance to the traffic.

5.5.2.3 With the addition of more kilometreage of roads during the Fifth and Sixth Plans the requirement of funds will increase and it is estimated that about Rs. 673 lakhs per year will be required during the Fifth Plan and Rs. 850 lakhs in the Sixth Plan. The Group recommends that the estimated requirement for the repairs and maintenance be provided in future so that the roads are properly looked after.

5.5.3 It will be relevant to quote here the findings of the Keskar Committe (1967) that the sub-standard condition of our roads is causing a national loss of Rs. 150 crores per annum, because the cost of operation per vehicle is 7 to 9 paise per kilometre higher on the existing sub-standard roads than it would be on reasonably good roads.

CHAPTER VI

FINANCIAL RESOURCES

6.1 Existing Pattern of Financing

6.1.1 At present, the income from the taxes on the road users such as duties and other taxes on petroleum products, passenger tax, motor vehicle registration fees, etc. is merged into general revenue of the State. Annually, a certain amount is alloted for the road development from the general revenue as per overall priority and the total provision in the Plan. Roads do not get the priority they deserve, resulting in inadequate provision for development of roads.

6.1 2 State Government also receives certain percentages from the excise duty and other central taxes collected by the Central Government in the form of Central Road Fund allocation. The Government of India approves road works to be financed from C R. F. allocation. These road works form part of the State Road Development Plan.

6.1.3 For certain roads of inter-State and economic importance, Government of India assists the State Governments in form of 100 per cent loan assistance. Such loans are to be repaid by the States with interest. Government of India approves the works to be undertaken under the loan assistance. Such loan assistance also falls far short of the requirement.

6.1.4 Government of India also assists the State Government in the construction of roads in the command areas of the major irrigation projects in form of Central sector Area Development Programme. This is in form of 100 per cent assistance.

6.1.5. The Government of India have also undertaken the programmes of development of chronically drought affected areas and of rural employment. The roads form one of the components of the above programmes and central assistance is given for the improvement and construction of roads.

6.1.6 National Highways are the property of the Government of India. They finance *entirely new construction, improvement, strengthening and maintenance. State Governments* execute the works and look after maintenance on agency basis

6.1.7 The total provision for Road Development in the country, taking into account all the above allocation, is much less than the requirement. This results in narrow roads, uneven surfaces and unbridged crossings making road transport comparatively costly. In India, the expenditure on roads compared to the national income is much less. The chart showing highway expenditure in relation to national income in different countries in 1967 will show that India spends less than 1 per cent of her national income for roads. The other chart will also show that percentage of expenditure on roads is showing a downward trend compared to the revenue realised from taxes on road users. The revenue realised from taxes is fast increasing while the expenditure on roads has not increased in proportion. The above two charts make it clear that the provision for roads requires to be increased *substantially if we have to keep pace* with the increasing needs of transport. Taking into consideration the multidimensional effect of roads in promoting employment, all round development and their defence capabilities, a higher allocation for roads is absolutely necessary.

6.2 Suggested Pattern and Revenues

6.2.1 It is suggested that the revenue realised from taxes on road users by the State Government be deposited in the form of a State Road Fund and the road programmes be financed from this fund. If it is not possible to deposit the full amount, the remaining amount,

after keeping a certain percentage for other activities, should be deposited in this fund. This way, the amount available for road development will be in direct proportion to the revenue realisation from road users. This fund should be non-lapsing.

6.2.2 Rural roads need greater attention now specially to sustain the Green Revolution. Roads are required to feed villages with hybrid seeds, fertilisers, etc. and to take out marketable surpluses quickly. Punjab and Hariyana have special programmes for rural roads. There the Agricultural Produce Market Committees finance such roads by levying cess at the rate of 1 per cent on sales through marketing committees. The amount so realised is made available to the State Highway Department for the construction of rural roads. Punjab and Hariyana expect to connect practically all the villages with pucca roads within the next five years. Such a scheme for the construction of rural roads with this type of assistance from marketing committees needs to be considered for our State.

6.2.3 The possibility of getting loans from long term credit institutions is also required to be considered.

6.2.4 State lotteries to finance particular road works could also be considered.

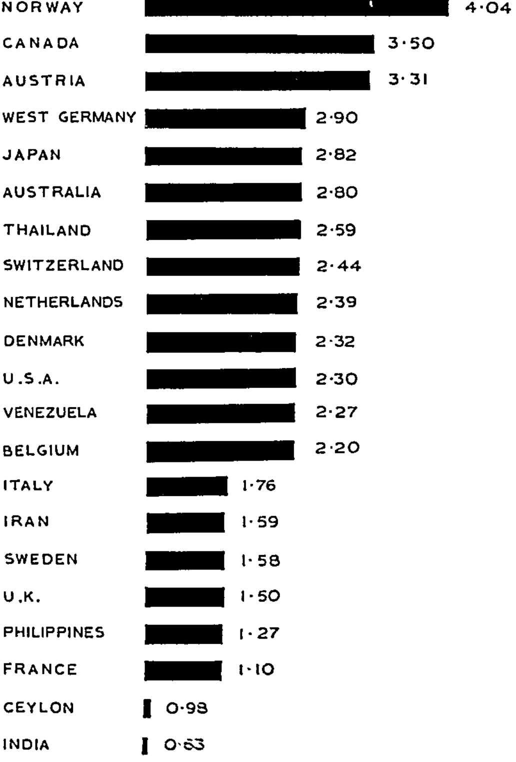
6.2.5 An increase in the passenger tax and also some increase in the annual vehicle tax on trucks, tractors, etc., can be considered. The increased revenue from this sources should be earmarked for the construction and maintenance of roads.

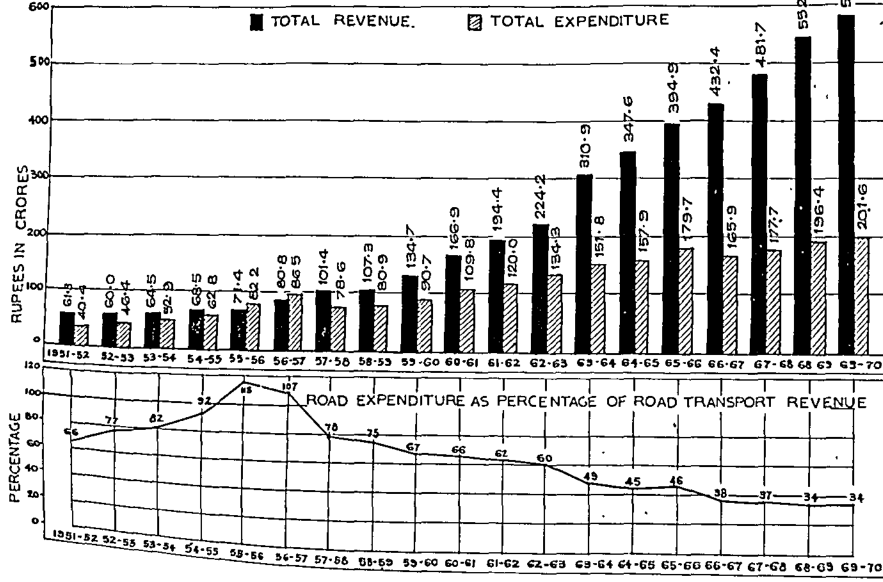
6.2.6.1 The policy on tolls may be reviewed. For better facilities, the public may not mind paying tolls provided smooth and quick arrangement for collection is devised. Private entrepreneurs may also wish to undertake the construction of tolls, roads and bridges on the specific understanding that the property will vest in Government after a certain number of years and no tolls will be levied thereafter.

6.1.6.2 Toll highways are common in America, Japan and on the Continent of Europe. The receipts are applied to the payment of interest and retirement of capital invested in the construction of highways, as also its cost of operation and maintenance. Hitherto, India has fought shy of introducing Toll Highways because the experience is that the collection of revenues in this manner leads to vexatious delays on the roads and is also a source of corruption. The Group feels that if super-highways of the type provided in other countries are to be built, as they must be, to serve the economic needs of Gujarat, a beginning just now be made with Toll Highways. The fear of delays and corruption can be laid at rest by introducing machines for the collection of tolls. Locally produced machines can be developed for this specific purpose.

6.2.6.3 It will be proper and relevant here to cite an example of a toll bridge reported to have been constructed by the Tamil Nadu Government in 1960. The bridge near Erode, constructed at an estimated cost of Rs. 13.22 lakhs in 1960, yielded Rs. 5.40 lakhs annual additional revenues to the State besides vehicular benefits in terms of reduced travel distance which amounted to Rs. 17.60 lakhs annually. It also accelerated the development of the adjacent villages, attracted new industrial units and provided additional employment opportunities.

HIGHWAY EXPENDITURE IN RELATION TO NATIONAL INCOME IN DIFFERENT COUNTRIES IN 1967 (PERCENTAGE)




REVENUE FROM ROAD TRANSPORT AND EXPENDITURE
ON ROADS IN INDIA SINCE 1951-52
TOTAL REVENUE.
TOTAL EXPENDITURE
RUPEES IN CRORES
0
100
200
300
400
500
600
61·8
40·4
60·0
46·4
64·5
52·9
68·5
62·8
71·4
82·2
80·8
86·5
101·4
78·6
107·3
80·9
134·7
90·7
166·9
109·8
194·4
120·0
224·2
134·3
310·9
151·8
347·6
157·9
394·9
179·7
432·4
165·9
481·7
177·7
552·3
196·4
584·5
201·6
1951-52
52-53
53-54
54-55
55-56
56-57
57-58
58-59
59-60
60-61
61-62
62-63
63-64
64-65
65-66
66-67
67-68
68-69
69-70
ROAD EXPENDITURE AS PERCENTAGE OF ROAD TRANSPORT REVENUE
PERCENTAGE
0
20
40
60
80
100
120
66
77
82
92
115
107
78
75
67
66
62
60
49
45
46
38
37
34
34

CHAPTER VII

CONCLUSION AND RECOMMENDATIONS

7.1 Perspective Plan at a Glance

7.1.1 Targets (physical)

(A) Basic (Twenty Year Plan)

(Length in kilometres)

Sr. No.	Year	National Highways	State Highways	Major District Roads	Other District Roads	Village Roads	Total
1	2	3	4	5	6	7	8
1	As on 31st March 1969	1,056	6,983	7,127	4,417	[illegible]	27,211
2	As on 31st March 1974 (Anticipated).	1,056	5,423	7,172	9,817	[illegible]	[illegible]
3	As on 31st March 1979 (Anticipated).	2,000	7,479	10,174	12,457	12,744	[illegible]
4	As on 31st March 1984 (Anticipated.	3,602	6,168	14,352	16,441	[illegible]	[illegible]

NOTE.—The decrease in the kilometres in column 4 is due to conversion of State Highways into National Highways.

(B) Additional on Need Consideration

	Kms
(i) Connecting all the villages with roads (pucca)	2,100
(ii) Providing asphalt surface to low grade roads	32,700
(iii) Providing infra-structure facility for major irrigation projects.	1,000
(iv) Satisfying needs of tourism, archaeology, industries, mining, ports, etc.	600
Total	36,600

(C) Miscellaneous:

(i) Conversion of busy level crossings into over/under bridges — [illegible]

(ii) Roadside amenities, arboriculture, etc.

7.1.2 Targets (Financial)

(i) *Requirements* — [illegible]

(a) Basic (to achieve Twenty Year Plan targets) — [illegible]

(b) Additional on need consideration — [illegible]

(c) Miscellaneous — [illegible]

Total — [illegible]

(ii) Suggested allocations

(Rs. in crores)

	Fifth Five Year Plan 1974-79	Sixth Five Year Plan 1979-84	Total
Basic	80.00	155.00	235.00
Additional on need consideration	46.00	99.00	145.00
Miscellaneous	4.00	6.00	10.00
Total ..	130.00	260.00	390.00

7.2 Aims

(*i*) To provide a network of 32 kilometres of roads per 100 sq. kilometre area at the end of the Plan.

(*ii*) To connect all the villages with pucca roads.

(*iii*) To make all low grade roads (existing and planned) pucca.

(*iv*) To cater to the special needs of tourism, archaeology, industries, mining, ports, etc.

7.3 Recommendations

(1) About 3602 kms. of National Highway length should be established in Gujarat at the end of Twenty Year Plan, *i. e.*, by 1984. As against this, 1056 kms. length of National Highway is existing at present. Ministry of Shipping and Transport, Government of India may be pressed to declare more roads as National Highways progressively so as to reach the target by 1984.

(2) Ahmedabad-Bombay section of National Highway, No. 8 passes through a heavy industrial belt and highly irrigated areas. This section also carries very heavy traffic and is important from the strategic point of view also. This section may, therefore, be recommended for widening to a four-lane Expressway.

(3) Level crossings on the roads hold up the traffic for a considerable time and cause great annoyance to traffic as well as loss. It is desirable to convert all level crossings on important roads into under or over bridges.

(4) Looking to the present day need of traffic, all roads should be made pucca.

(5) For better quality control and speedier execution of the works, use of heavy machinery and plants should be introduced for major projects.

(6) To cater to the expected increase in traffic and its smooth flow, all the important State Highways should be widened to two lanes.

(7) Long distance traffic needs rest and recreational facilities during their journey. Private entrepreneurs may be encouraged to open motels and hotels on all through routes at regular intervals.

(8) A good part of the income derived from taxes and levies on road users should be deposited in the form of a State Road Fund and road projects should be financed from this fund.

(9) For financing rural roads, a levy on sales through Agricultural Marketing Producers Committees on the lines of the States of Punjab and Hariyana may be considered.

(10) Possibility of I. D. A. and such other organisations' assistance for financing road projects may be examined.

APPENDIX A

NUMBER OF TOWNS CLASSIFIED ACCORDING TO POPULATION GROUPS

Year 19

Sr. No.	District	Less than 2,000	2,001 to 5,000	5,001 to 10,000	10,001 to 20,000	20,001 to 50,000	50,001 to 1,00,000	1,00,001 and above	Total
1	2	3	4	5	6	7	8	9	10
1	Ahmedabad	1	..	4	4	4	.	1	14*
2	Amreli	.	2	5	5	1	..	..	13
3	Kutch	.	..	2	..	4	..	.	6
4	Kaira	.	.	5	5	5	2	.	17
‡5	Gandhinagar	.	.	..	..		..	..	..
6	Jamnagar	..	1	7	5	1	.	1	15
7	Junagadh	.	1	5	7	2	2	..	17*
8	Dangs	.	.	.	..	.	..	.	.
9	Panchmahals	.	.	3	3	1	1	..	8
10	Banaskantha	.	.	1	2	1	..	.	4
11	Broach	.	..	.	1	2	1	.	4
12	Bhavnagar	.	1	6	1	4	..	1	13
13	Mehsana	.	.	2	5	6	1		14
14	Rajkot	.	3	2	2	5	1	1	14
15	Baroda	.	.	4	3	1		1	9
16	Bulsar	.	.	4	3	2	1	.	10
17	Sabarkantha	.	.	1	4	..	..	.	5
18	Surat	.	.	2	4	..	.	1	7
19	Surendranagar	.	.	7	..	4	.	..	11
	Gujarat State	1	8	60	54	43	9	6	181

* Patan in Junagadh district and Naroda, Sahijpur Bogha, Ranip, Ahmedabad Cantonment (Civil) and Ahmedabad Cantonment (Military) have been taken as independent towns while classifying the towns in different population groups.

‡ Included in Ahmedabad and Mehsana districts

APPENDIX B

NUMBER OF VILLAGES CLASSIFIED ACCORDING TO POPULATION GROUPS

Year 1961

Sr. No.	Group	Number of inhabited villages	Total Rural Population		
			Males	Females	Persons
1	2	3	4	5	6
1	Less than 200	3,202	1,87,909	1,75,006	3,62,915
2	200 to 499	5,302	9,33,463	8,85,568	18,19,031
3	500 to 999	5,299	19,40,841	18,58,744	37,99,585
4	1,000 to 1,999	3,301	22,98,496	22,13,002	45,11,498
5	2,000 to 4,999	1,332	19,67,372	18,81,180	38,48,552
6	5,000 to 9,999	141	4,57,251	4,32,133	8,89,384
7	10,000 and above	7	44,890	40,871	85,761
	Total	18,584	78,30,222	74,86,504	1,53,16,726

APPENDIX C

CATEGORYWISE ROAD KILOMETREAGE IN GUJARAT STATE CONSTRUCTED DURING VARIOUS FIVE YEAR PLANS UPTO MARCH, 1970

(Figures in kilometres)

Sr No	Year	National Highway	State Highway	Major District Roads	Other District Roads	Village Roads	Total
1	2	3	4	5	6	7	8
1	As on 31st March 1951	597	1,507	2,710	4,650	3,660	13,154
2	As on 31st March 1956	716	1,958	3,112	6,951	5,052	17,787
3	As on 31st March 1961	1,005	4,025	6,056	7,007	4,505	22,628
4	As on 31st March 1966	1,033	5,125	7,132	7 063	5,674	26,029
5	As on 31st March 1969	1,056	6,983	7,127	8,117	8,628	32,211
6	As on 31st March 1970	1,056	8,003	6,599	8,532	9,113	33 333
7	As on 31st March 1971 (Anticipated) ..	1,056	8,423	7,173	9,817	9,988	36,457

APPENDIX C-1

DISTRICT-WISE AND CATEGORY-WISE ROAD KILOMETREAGE IN GUJARAT STATE AS ON 31ST MARCH, 1970

(Figures in kms.)

Sr. No.	Name of the District	National Highways	State Highways	Major District Roads	Other District Roads	Village Roads	Total
1	2	3	4	5	6	7	8
Gujarat Region :							
1	Ahmedabad	113	488	325	411	209	1,546
2	Kaira	70	530	373	301	163	1,440
3	Mehsana	..	485	417	127	533	1,562
4	Sabarkantha	93	320	351	84	540	1,388
5	Banaskantha	..	612	570	478	411	2,101
6	Gandhinagar	..	27	21	66	8	122
7	Baroda	69	338	221	650	726	2,004
8	Broach	40	381	380	435	190	1,426
9	Bulsar	111	261	314	427	641	1,754
10	Surat	55	374	481	639	647	2,196
11	Panchmahals	..	441	345	1,265	836	2,887
12	Dangs	..	124	76	207	267	674
	Total, Gujarat Region ..	560	4,411	3,874	5,090	5,171	19,106
Saurashtra Region :							
13	Rajkot	238	351	352	763	840	2,544
14	Bhavnagar	..	375	435	560	1,108	2,478
15	Amreli	..	349	477	329	589	1,744
16	Surendranagar	121	339	301	293	338	1,392
17	Jamnagar	..	578	286	470	169	1,503
18	Junagadh	60	560	517	473	628	2,238
	Total, Saurashtra Region ..	419	2,552	2,368	2,888	3,672	11,899
Kutch Region							
19	Kutch	77	1,040	357	554	300	2,328
	Total for Gujarat State ..	1,056	8,003	6,599	8,532	9,143	33,333

APPENDIX D

DISTRICTWISE ROAD KILOMETREAGE PERCENTAGE DEFICIT AS PER NAGPUR PLAN AND TWENTY YEAR P IN GUJARAT STATE

Sr No.	Name of the District	Nagpur Plan target (1943-61)	Twenty Year Plan target (1961-81)	Kilometreage existing as on 31st March 1951	Kilometreage existing as on 31st March 1961	Kilometreage existing as on 31st March 1970	Percentage of deficit		Kilometre existing as on 31st March	
							Nagpur Plan	Twenty Year Plan	Per lakh of population	Per 100 sq. kms.
1	2	3	4	5	6	7	8	9	10	11
	Gujarat Region :									
1	Ahmedabad	2,460	3,008	762	1,360	1,546	37	57	73	18
2	Baroda	2,510	3,412	605	1,507	2,004	20	41	131	26
3	Broach	1,961	2,619	530	823	1,426	27	46	160	18
4	Surat }	3,827	5,475	2,714	2,603	3,950		28	167	30
5	Bulsar }								154	34
6	Dangs	321	663	190	556	674	.	..	936	38
7	Kaira	3,410	4,429	716	1,225	1,446	58	67	73	21
8	Mehsana	3,352	4,035	261	698	1,562	53	60	96	14
9	Panchmahals	2,861	3,574	766	1,095	2,687		19	197	32
10	Banaskantha	2,294	3,729	39	604	2,101	8	44	211	20
11	Sabarkantha	2,228	2,634	161	745	1,388	38	47	161	19
12	Gandhinagar		*	.	*	122	..	.	69	19
	Total, Gujarat	25,224	34,175	6,744	11,416	19,106	24	44	135	23
	Saurashtra Region :									
13	Amreli	1,459	2,473	926	1,274	1,744		29	261	53
14	Bhavnagar	2,409	3,366	1,127	1,658	2,478		27	221	21
15	Jamnagar	1,507	3,141	734	1,391	1,503		52	182	18
16	Junagadh	2,225	3,766	1,602	2,034	2,238		41	160	20
17	Rajkot	1,934	3,647	1,235	1,840	2,544		30	210	21
18	Surendranagar	1,705	2,975	359	1,254	1,392	18	53	210	12
	Total, Saurashtra	11,239	19,358	5,983	9,451	11,899		39	208	20
	Kutch :									
19	Kutch	2,684	4,065	427	1,762	2,328	13	43	334	5
	Total, Kutch	2,684	4,065	427	1,762	2,328	13	43	334	6
	Grand Total, Gujarat State	39,147	57,628	13,154	22,629	33,333	15	43	162	1

* Included in Ahmedabad and Mehsana districts.

APPENDIX E

EXPENDITURE INCURRED ON ROADS FROM THE FIRST FIVE YEAR PLAN TO 1969-70

(Rs. in lakhs)

Sr. No.	Name of District		First Five Year Plan	Second Five Year Plan	Third Five Year Plan	Total (Column 3+4+5)	1966-67	1967-68	1968-69	1969-70	Total expenditure upto 1969-70
1	2		3	4	5	6	7	8	9	10	11
	Gujarat Region :										
1	Ahmedabad	..	64.20	166.11	106.38	336.99	35.60	28.27	65.45	59.94	536.25
2	Baroda	..	94.19	135.15	129.48	358.82	34.59	36.17	22.60	25.73	177.31
3	Broach	..	74.69	185.45	144.15	404.29	27.13	28.31	36.09	33.08	528.90
4 5	Surat Bulsar	.	125.30	236.78	200.27	562.35	34.09	63.14	65.03	67.97	793.48
6	Dangs	..	58.30	..	35.77	94.07	34.00	4.50	4.40	8.77	115.74
7	Kaira	..	164.93	164.87	92.39	422.19	15.37	19.53	36.45	55.99	549.53
8	Mehsana	..	107.02	186.16	92.38	385.56	32.70	29.19	54.10	43.01	544.65
9	Panchmahals	..	112.37	113.15	54.82	280.34	8.31	7.11	21.76	17.88	335.70
10	Sabarkantha	..	115.55	163.26	59.78	338.59	17.41	17.51	17.42	35.55	426.51
11	Banaskantha	..	93.25	252.80	97.70	443.75	10.02	7.91	20.78	26.03	508.49
12	Gandhinagar	..	..	..	..	..	..	..	..	*10.82	10.82
	Total, Gujarat Region.		1,009.80	1,604.03	1,013.12	3,626.95	220.12	251.97	343.57	384.77	4,827.38
	Saurashtra Region :										
13	Amreli	..	11.63	50.39	76.20	138.22	10.02	8.37	14.51	12.53	183.65
14	Bhavnagar	..	53.72	119.00	71.25	243.97	14.09	10.31	13.18	16.50	307.95
15	Jamnagar	..	36.47	79.67	144.14	230.28	10.94	15.46	15.60	8.60	289.88
16	Junagadh	..	28.30	157.64	137.08	323.02	16.06	26.46	23.15	26.17	414.86
17	Rajkot	..	80.18	126.62	57.61	264.41	13.81	14.00	18.18	21.13	331.53
18	Surendranagar	.	40.98	144.84	87.63	273.45	7.88	15.78	14.65	15.88	327.64
	Total, Saurashtra Region.		251.28	678.16	543.91	1,473.35	82.70	99.38	99.27	100.81	1,855.51
19	*Kutch*	..	46.88	101.50	79.74	228.12	5.33	2.24	14.27	16.45	266.41
	Grand Total Gujarat State.	..	1,307.96	2,383.69	1,636.77	5,328.42	308.15	353.59	457.11	502.03	6,949.30

* Earlier figures included in Ahmedabad and Mehsana districts.

APPENDIX F

TRAFFIC INTENSITY IN TONNES AND IN TERMS OF PRIVATE CAR UNIT ON SOME IMPORTANT ROAD SECTIONS

Sr No	Road / Road Section	Category of Road	Traffic intensity in terms of tonnes (per day)			Anticipated traffic intensity in terms of Private Car Unit (per day)		
			1960-61	1965-66	1970-71	1970-71	1974	1984
1	2	3	4	5	6	7	8	9
1	*Ahmedabad-Baroda*	*N H*	*13,920*	*15,832*	*28,857*	*10,965*	*14,474*	*23,961*
	Baroda-Broach	N H	5,880	11,021	14,837	5,638	8,175	20,611
3	Broach Surat	N H	4,034	6,631	9,031	3,431	4,700	10,528
4	Ahmedabad-Kalol	S H	5,524	6,600	11 033	4,192	5,450	10,900
5	*Nadiad-Dakor*	*S H*	*5,716*	*8,009*	*8,417*	*3,193*	*3,838*	*6,333*
6	Nadiad Mahudha	S H	1,536	3 514	3 410	1,307	1,791	4,012
7	Mahudha-Kapadvanj	S H	1,522	3 845	3 793	1 441	2,522	6,280
8	*Halol-Bodeli Section*	S H	2 416	4,776	7,586	2,851	5 304	10,117
9	Surat-Dumas Section	S H	1,112	2,032	2,929	1,113	1,981	5,210
10	Surat-Kadodra	S. H	2,121	3,827	4,184	1,587	2,066	3,863
11	Himatnagar Idar-Khedbrahma	S H	2 080	3 418	3 945	1,499	1,904	3,018
12	Rajkot-Jamnagar	S H	4,100	4,462	5,542	2,105	3,180	10,748
13	Jamnagar Sikka	S H	2,665	3,300	3 684	1,400	1,804	2 164
14	Surendranagar-Dolia	S. H	2,300	4,600	6,370	2,421	3 728	10,321
15	Surendranagar-Viramgam	S H	2,426	4,140	4,446	1,680	2,094	3,811
16	Bhuj-Mandvi	S. H	1,724	1,453	2,510	54	1,007	1,70[illegible]
17	Ahmedabad Bhavnagar	S H	3,178	7,168	9,178	3,488	5,476	15,680

N H = National Highway. S. H. = State Highway

APPENDIX G

MONUMENTS WHICH ARE NOT CONNECTED BY ROAD AND TRANSPORT

Requirement of Archaeological Department

Sr. No.	Name of the Monument	Locality Taluka District	Nearest village or bus stand for monument	Distance of monument from bus stand	Present position of road from bus stand to monument
1	2	3	4	5	6
				kms.	
1	Shakti Kund	V. Akhaj T. Mehsana. D. Mehsana	Ambliyasan	8	Murrum Road.
2	Shitla Mata Temple ..	V. Butapaladi T. Mehsana D. Mehsana	Paladi	3	Do.
3	Group of Monuments of Abhapur (6) Six (up to Jain Temple)	V. Abhapur T. Vijaynagar D. Sabarkantha	Atarsuba ..	10	Rough Road.
4	Group of Monuments of Atarsuba (8).	V. Atarsuba T. Vijaynagar D. Sabarkantha	Atarsuba	2	Do.
5	Group of Monuments of Kaleshwari (8)	V. Lawana T. Lunavada D. Panchmahals	Babliya	3	1½ km. Metal and Rough Road.
6	Kadia Dungar Caves ..	Zazporo	Jaspur	5	Rough Road
7	Dezariya Mahadeo	Dezar	Mandrava	10	9 km. Metal Road 1 km. Rough Road.
8	Group of Monuments of Gumali (3)	V. Gumali T. Bhanwad D. Jamnagar	Bhanwad	6	Murrum Road.
9	Group of temples (8) Pachhatar.	V. Pachhatar T. Bhanwad D. Jamnagar	Bhanwad	10	Rough Road
10	Group of temples of Bhansara	V. Bhansara T. Porbandar D. Jamnagar	Bhalej	6	Do.
11	Munibava temple ..	V. Than T. Chotila D. Surendranagar	Than	3	Do.
12	Upar Kot (7) ..	D. Junagadh	City	6	Metal Road.
13	Bhucher Mori	V. Dhrol T. Dhrol D. Jamnagar	Dhrol	2	Rough Road
14	Sana Caves	V. Sana T. Una D. Junagadh	Una	10	Do.
15	Firangi Temples ..	V. Kalasar T. Mahuva D. Bhavnagar	Mahuva	18	Do.
16	Caves of Khambhalia ..	V. Pithadia D. Rajkot	Virpur	5	Do.
17	Monuments of Kankavati (2)	V. Kankavati T. Dhrangadhra D. Surendranagar	..	8	Do.

V=Village; T=Taluka; D=District.

APPENDIX II

REQUIREMENTS FOR THE LINK ROADS JOINING MINING AREAS

Link Roads

Baroda District (For Dolomite Mines) :

(1) Chhota-Udepur.—Link roads of about 16 kms. required for linking main road with mines.

Panchmahals District (For Trap Rock quarries) :

(1) 3 kms. link road required from Halol-Pavagadh Helical Vav to mines area.

(2) 5 to 6 kms. link road required from Jambudi area to Pavagadh-Halol Road.

Surat District (For Trap Rock quarries) :

(1) 1 km. link road required from Jab village to Kim-Mandvi Road.

Kutch District (For Bauxite, Lignite, Bentonite, Limestone mines) :

(1) 24 kms. link road required from Nana-Asambia to Nagracha.

(2) 24 kms. link road required from Gaduli to Panandero to Lakhpat.

Jamnagar District (For Bauxite mines) :

(1) 24 kms. link road required for Jamnagar, Virpur Ran, Bhopika Bhopika is 8 kms. way from Highway.

(2) About 13 kms. link road required from Mahadevia to Highway.

(3) About 27 kms. link road *via* Hadmatia required from Lamba Gandhvi to Bhatia. Station.

Bhavnagar District (For Bauxite mines) :

(1) 22 kms. link road required from Bhavnagar to Lakhnaka Bentonite leases.

Junagadh District (Whiting chalk mines of Porbandar) :

(1) Link road requirement of about 24 kms. to connect the main road of Ranavav.

Surendranagar District (for clay mines) :

(1) Link Road required from Vagadia to Muli on Surendranagar-Rajkot Road.

APPENDIX G

MONUMENTS WHICH ARE NOT CONNECTED BY ROAD AND TRANSPORT

Requirement of Archaeological Department

Sr. No.	Name of the Monument	Locality Taluka District	Nearest village or bus stand for monument	Distance of monument from bus stand	Present position of road from bus stand to monument
1	2	3	4	5	6
				kms.	
1	Shakti Kund	V. Akhaj T. Mehsana. D. Mehsana	Ambliyasan	8	Murrum Road.
2	Shitla Mata Temple ..	V. Butapaladi T. Mehsana D. Mehsana	Paladi	3	Do.
3	Group of Monuments of Abhapur (6) Six (up to Jain Temple)	V. Abhapur T. Vijaynagar D. Sabarkantha	Atarsuba ..	10	Rough Road..
4	Group of Monuments of Atarsuba (8).	V. Atarsuba T. Vijaynagar D. Sabarkantha	Atarsuba	2	Do.
5	Group of Monuments of Kaleshwari (8)	V. Lawana T. Lunavada D. Panchmahals	Babliya	3	1½ km. Metal and Rough Road.
6	Kadia Dungar Caves ..	Zazporo	Jaspur	5	Rough Road
7	Dezariya Mahadeo	Dezar	Mandrava	10	9 km. Metal Road 1 km. Rough Road.
8	Group of Monuments of Gumali (3)	V. Gumali T. Bhanwad D. Jamnagar	Bhanwad	6	Murrum Road.
9	Group of temples (8) Pachhatar.	V. Pachhatar T. Bhanwad D. Jamnagar	Bhanwad	10	Rough Road
10	Group of temples of Bhansara	V. Bhansara T. Porbandar D. Jamnagar	Bhalej	6	Do.
11	Munibava temple ..	V. Than T. Chotila D. Surendranagar	Than	3	Do.
12	Upar Kot (7) ..	D. Junagadh	City	6	Metal Road.
13	Bhucher Mori	V. Dhrol T. Dhrol D. Jamnagar	Dhrol	2	Rough Road
14	Sana Caves	V. Sana T. Una D. Junagadh	Una	10	Do.
15	Firangi Temples ..	V. Kalasar T. Mahuva D. Bhavnagar	Mahuva	16	Do.
16	Caves of Khambhalia ..	V. Pithadia D. Rajkot	Virpur	5	Do.
17	Monuments of Kankavati (2)	V. Kankavati T. Dhrangadhra D. Surendranagar	..	8	

V=Village ; T=Taluka ; D=District.

APPENDIX J

ESTIMATED REQUIREMENT OF MACHINERY AND EQUIPMENT FOR THE IMPLEMENTATION OF THE FIFTH AND SIXTH FIVE YEAR PLANS

Sr. No.	Item	Annual requirements (in numbers)	
		Fifth Plan	Sixth Plan
1	2	3	4
1	Trucks	600	900
2	Road rollers	300	500
3	Concrete mixers	40	60
4	Concrete vibrators	80	120
5	Bitumen mixers	100	150
6	Bitumen pressure distruibutors	20	30
7	Bitumen boilers	140	210
8	Air compressors with drilling equipment	60	90
9	Stone crushers	120	180
10	Motor graders	88	132
11	Motorised scrapers	12	18
12	Dumper trucks	40	60
13	Power shovels (½ cu. yd)	12	18
14	Water tankers (750 gallons)	100	150
15	Pumps	40	60
16	Pneumatic tyred rollers	8	12
17	Dozers	12	18
18	Continuous hot mix asphalt plants	8	12
19	Core drilling machines	2	3
20	Girder launcher	1	1
21	Grab dredgers	8	12
22	Cement grouting machines	2	3
23	Pile driving equipment	2	2

Report of the Working Group

on

Transprot and Communications

Part - II

Road Transport

CHAPTER I

INTRODUCTION

1.1 Under Government Resolution, General Administration Department No. TYP/1071-D, dated 7th August 1971, Government of Gujarat had appointed a Working Group for preparation of the Ten-Year Perspective Plan for Transport and Communications. For the preparation of the Perspective Plan for Road Transport, a Sub-group consisting of the following members was constituted :—

Shri R. K. Anklesaria, ..	.. Vice-Chairman and General Manager, Gujarat State Road Transport Corporation	Chairman
Shri S. R. Derasari ..	.. Dy. General Manager, GSRTC	Member
Shri S. C. Desai ..	.. Chief Statistician, GSRTC	Member-Secretary.

1.2 The draft report prepared by the Sub-group was discussed in the meeeting of the Working Group for Transport and Communications held on 23rd September 1971. A meeting of the Working Group was also held on 28th September 1971 to discuss the format of the reports to be prepared by the various Sub-groups.

1.3 In the meeting of the Working Group held on 23rd September 1971 Dr. Samuel Paul from the Indian Institute of Management, Ahmedabad had suggested that for estimating the future demand for passenger transport, an attempt should be made to study the relationship between growth of passenger traffic and economic indicators such as State income, road development, growth of agriculture, industrial development, etc. In consultation with Dr. Samuel Paul, a number of models were fitted to study the above relationship by using the computer at the Indian Institute of Management, Ahmedabad. The results of the above study are given separately in this Report in Chapter III. The Sub-group appreciates the interest shown by Dr. Samuel Paul in the above study and thanks him for his valuable advice.

1.4 The report of the Sub-group, taking into account the various suggestions made in the two meetings of Working Group, is submitted below :—

The Gujarat State Road Transport Corporation (GSRTC) was formed on the 1st of May 1960 when the separate State of Gujarat was formed. When the Corporation was formed, the percentage of nationalisation of passenger road transport services on mofussil routes in the State was about 90. During the last 11 years the Corporation has taken over 261 routes which were in the hands of private operators and has completed 100 per cent nationalisation in the State as against nationalisation to the extent of only about 40 per cent in the country as a whole. The Corporation also increases the frequency of services on routes operated by it to cater to the natural growth of traffic from year to year. Besides, the Corporation has opened up a number of new routes in the rural areas for the purpose of extending transport facilities in the State. Consequently, the effective kilometreage operated by the Corporation increased by about 12 per cent every year, whereas the number of routes operated have increased from 1688 on 1st May 1960 to 5504 on 1st May 1971. As a result of the rapid expansion of services mentioned above, bus services have been provided directly to 61.3 per cent of the towns and villages in the State covering 85.5 per cent of the State population. Besides, 21.6 per cent of the villages covering 8.5 per cent of the State population are provided with bus facilities within a distance of 3 kms. Thus, 82.9 per cent of the towns and villages covering 94.0 per cent of the State population are provided with bus facilities within a distance of 3 '

9.7 per cent of the villages covering 3.5 per cent of the State population are provided with bus services within a distance of 3 to 5 kms. and 7.4 per cent of the villages covering 2.5 per cent of the State population avail of State Transport services from a distance beyond 5 kms. The main handicap in providing bus services from a nearer distance to these villages is the lack of motorable roads connecting these villages. A table showing the progress of operations of GSRTC during the last 11 years is given in Appendix 'A'.

1.5 In addition to the expansion of services, the Corporation has taken a number of measures to control the cost of operation and increase its revenues. Thus, it has increased the vehicle utilisation from 166.7 kms. in 1959-60 to 233.9 kms. in 1970-71 and the fleet utilisation from 64.3 per cent in 1959-60 to 78.5 per cent in 1970-71. It has reduced the cost per km. on spare parts and reconditioning of buses and assemblies from 17.28 paise to 7.64 paise. The crew utilisation in terms of kms. has increased from 116.0 kms. in 1960-61 to 140.8 kms. in 1970-71. Besides control of the cost of operation as mentioned above, the Corporation has taken steps to improve the earnings per km. from 91.38 paise in 1959-60 to 140.17 paise in 1970-71, by rationalising the services and slight increase in fares. As a result of the above measures, the profitability of the Corporation has shown a marked improvement and the return on capital employed has improved from only 6.2 per cent in 1960-61 to 15.05 per cent in 1970-71. Also, the Corporation was able to keep the net fare received by it at a low level despite heavy increase in the prices of vehicles, auto stores, and wages of staff. The Corporation has also improved the quality of service in respect of regularity, breakdowns and accidents and has provided amenities to the public in the form of bus stations, canteens, water arrangements and pickup stands within the limits of finances available.

CHAPTER II

PROBLEMS FACED BY THE CORPORATION

2.1 As mentioned earlier, the Corporation has succeeded in rapidly increasing the transport facilities in the rural areas of the State during the last 11 years. It may not be out of place to indicate in brief the problems faced by the Corporation in expanding its services.

2.2 Funds for Development

It is noticed that passenger traffic on roads in the State has been increasing at the rate of 15 per cent per year. In order to cater to this increase in traffic it is necessary to increase the number of schedules operated at least by 10 per cent every year; the balance of the increase in traffic being catered to by increasing the seating capacity of the fleet and the kms. operated by a vehicle. The Working Group appointed by the State Government for preparation of the Fourth Five Year Plan of the Gujarat State Road Transport Corporation had assessed the capital requirements of the Corporation at 10 per cent expansion per year at Rs. 21.54 crores to be financed from a capital contribution of Rs. 10 crores from the State Government, internal resources of the Corporation at Rs 6.54 crores (total State Plan, Rs. 16.54 crores) and capital contribution from the Central Government at Rs. 5 crores The State Government has, *however, restricted the size of the Fourth Plan of GSRTC at Rs 8.00 crores. Under the approved Plan it would be possible for the Corporation to increase the number of schedules* operated only at the rate of 4.75 per cent per year against the requirement of expansion at 10 per cent. Due to shortage of funds the Corporation could increase the number of schedules operated only by 7.5 percent in 1969-70, the first year of the Fourth Five Year Plan and by only 4 per cent in 1970-71, the second year of the Fourth Five Year Plan, while the revised Annual Plan for the year 1971-72 provides for an expansion of 8 per cent by keeping 154 over-aged vehicles in service. As the natural rise in traffic in the State continues to be high at 15 per cent, the Corporation has requested the State Government to provide adequate funds to the Corporation to facilitate expansion of schedules at least at the rate of 8 per cent, if not 10 per cent, during the last 3 years of the Fourth Five Year Plan, viz, 1971-72 to 1973-74.

2.3 Increase in Taxation

The rapidly rising cost of operation from year to year on account of increase in taxation by the State and Central Governments on the road transport industry has also been a major problem facing the organisation. For example the rate of passenger tax which was only 10 per cent when GSRTC was formed has steadily increased to 23 per cent from September, 1969. Similarly, the rates of Sales Tax on diesel and auto-stores and the rates of M. V. tax have also increased. The rates of excise duty levied by the Central Government on petrol, diesel, tyres and tubes, batteries and chassis have also risen very steeply. As a result of the above rise in taxation, the estimated cost per km. on direct and indirect taxes which was only 29.9 paise per km. in 1960-61 has increased now to 63.6 paise per km. The expenditure on taxes to the total cost of operation has also increased from 30.2 per cent in 1960-61 to 43.4 per cent at present. On account of increase in taxation, prices of materials and wages, the average price of a Leyland and Tata bus has also increased very steeply from Rs. [illegible] in 1960 to Rs. [illegible] today. Thus, the increase in taxation is a serious strain on the revenue as well as the capital funds of the Corporation. To facilitate the rapid development of passenger road transport services in the State, it is essential that the heavy taxation on the industry by the State and Central Governments is reduced as recommended by the Road T[illegible] Committee.

2.4 Kutcha Roads

2.4.1 In the matter of road development, Gujarat State is much behind the rest of the country, partly due to historical reasons. At the beginning of the Fourth Five Year Plan, the State was behind the targets of road development laid down under Chief Engineers' Plan by as much as 44.1 per cent while the country as a whole was behind the tragets by only 8.1 per cent.

2.4.2 In spite of the paucity of roads, nationalisation of passenger road transport services has been completed 100 per cent in Gujarat as against only 40 per cent in the country as a whole and the Corporation has extended its services on bad and kutcha roads in order to provide transport facilities to the travelling public. About 60 per cent of the length of roads on which the Corporation runs its services consists of kutcha roads and as a consequence about 30 per cent of the schedules are suspended in the monsoon period due to kutcha roads being unmotorable. The travelling public experiences considerable inconvenience due to the suspension of services during the monsoon period on kutcha roads. Further, the Corporation incurs a heavy loss during the monsoon as its assests and staff remain unutilised during this period. Further, even during the 8 months of the fair weather when the kutcha roads are motorable, the Corporation is required to incur comparatively higher cost for operating services on these routes.

2.4.3 In this connection, a table showing the revenues earned by State and Central Governments from road transport and the expenditure on roads by the State Government in Gujarat and for all the States in India for the last 3 years is given below: (Revenue from M. V. Tax, passenger and goods tax and sales tax on the fuel by State Governments and from excise and import duties on motor vehicles, tyres and tubes and fuel by the Central Government).

I (a) Gujarat State

Year 1966-67 to 1968-69	Revenue (Rs. in lakhs)	Expenditure (Rs. in lakhs)			Percentage of total expenditure to revenue
		Development	Maintenance	Total	
Total ..	3,666	1,119	1,271	2,390	65.19

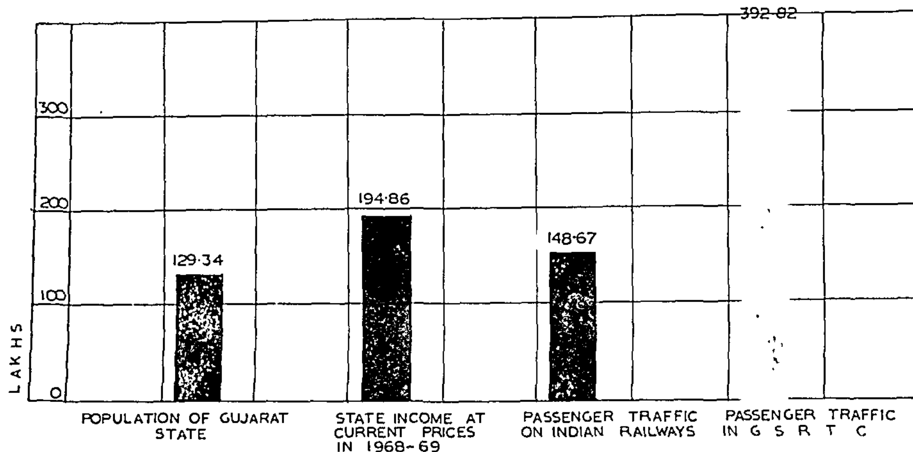
I (b) All India

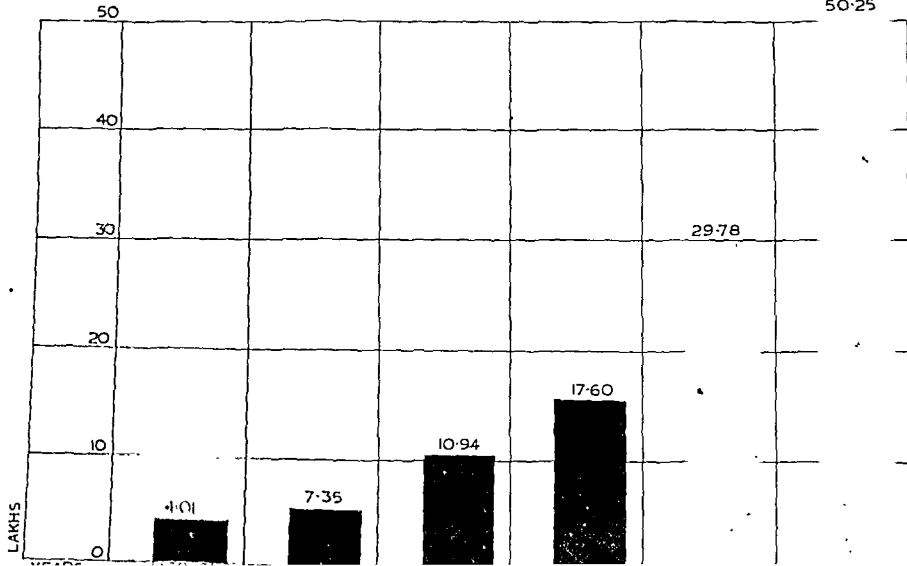
Year 1966-67 to 1968-69	Revenue (Rs. in lakhs)	Expenditure (Rs. in lakhs)			Percentage of total expenditure to revenue
		Development	Maintenance	Total	
All State Governments.	48,462	16,339	14,076	30,415	62.81
Central Governments.	95,933	17,113	2,601	19,714	20.54

Source.—Road Facts India 1969.

2.4.4 It will be seen from the table that, for the country as a whole, the State Governments spend 62.81 per cent and Gujarat spends 65.19 per cent of the revenues from road transport for development and maintenance of roads. The expenditure incurred by the Central Government for development and maintenance of roads was very low at only 20.54 per cent. The Road Transport Taxation Inquiry Committee appointed by the Government of India, Ministry of Transport and Shipping, in Chapter IX of their final report, have summarised the importance of development of roads as below :—

"In most underdeveloped countries, in view of the advantages that roads and road transport can bring, the expenditure on road improvement and maintenance far exceeds the revenue


GROWTH OF PASSENGER TRAFFIC ON ROADS IN GUJARAT STATE
(INDEX NUMBERS IN 1970-71 WITH BASE 1960-61)
LAKHS
0
100
200
300
129·34
194·86
148·67
392·82
POPULATION OF GUJARAT STATE
STATE INCOME AT CURRENT PRICES IN 1968-69
PASSENGER TRAFFIC ON INDIAN RAILWAYS
PASSENGER TRAFFIC IN G S R T C



EXPECTED GROWTH OF PASSENGERS TRAFFIC BY ROAD (AT THE END OF VI PLAN)
AVERAGE NO OF PASSENGERS CARRIED PER DAY DURING THE YEAR (IN LAKHS)
LAKHS
0
10
20
30
40
50
4·01
7·35
10·94
17·60
29·78
50·25

collected from the road transport industry. The situation in India, however, is differ
In spite of the poor condition of the roads in the country and in spite of the fact that
have enormous lag which has to be made up, the expenditure on road improvement a
maintenance is very low in comparision with total revenue realised by the Government (bo
Central and State) from the road transport industry.

In short, considering (a) the developmental role of road transport; (b) that we have an enormous backlog in respect of roads which has to be made up in the immediate future, and (c) that roads can be rightly considered as an essential service at par with education and health, the expenditure on road maintenance and improvements need not be restricted to the revenues collected from the road transport industry. If India is to benefit from the contribution which roads and road transport can make to economic and social development, then there is no escape from earmarking considerably more funds for the development and better maintenance of roads than is being done at present".

2.4.5 In view of the position described in the preceding paragraphs it is essential that the expenditure on development and maintenance of roads in Gujarat State is increased substantially.

2.4.6 The length of kutcha tracks operated by the Corporation today is over 34000 kms. A programme of modernisation of these routes would involve a huge outlay.

2.4.7 The targets for road development at the end of the Sixth Five Year Plan have now been framed so as to provide a motorable road connecting all villages in the State. However, pending completion of the above programme of road development, GSRTC will have to continue to operate services on a large number of kutcha roads during the Fifth Plan and to a smaller extent, in the Sixth Plan.

2.4.8 In the circumstances, it is necessary to make special provision in the Fifth and Sixth Five Year Plans for maintenance and repairs of kutcha tracks on which State Transport Services are operated in the State. Special grants at the rate of Rs. 2 lakhs per year may be provided to all District Panchayats for repairs of State Transport roads suspended in monsoon so that the services can be quickly resumed as soon as the rains are over. All District Panchayats and Taluka Panchayats may also be provided with road graders which can be used for repairs to State Transport roads after the monsoon is over. A programme of construction of culverts on the routes operated by State Transport should also be included in the annual plans of road development prepared by the District Panchayats. The above provision will facilitate early resumption of State Transport Services suspended during the monsoon period and to that extent t will mitigate the hardships of the travelling public. At the district level, the programme for pairs of kutcha routes operated by State Transport and of the construction of culverts on State utes should be prepared in consultation with the Divisional Controllers incharge of operating services on these routes

2.4.9 Similarly, at the time of preparation of plans for road development for five year period ell as the annual plan, a representative of the Corporation may be associated at the district as well as at the State level so as to co-ordinate the plans of road development at the State s well as the district level with the needs of GSRTC. Such a co-ordination will help to the extent of operations on kutcha routes and in turn augment the revenue of the State ment by way of tax receipts from GSRTC

0 At the rate of 10 per cent expansion in schedules GSRTC is likely to contribute crores of rupees by way of passenger tax, motor vehicle tax and sales tax on diesel receipts of the State Government in the Fifth Five Year Plan and 133 crores of rupees Five Year Plan. In view of the large contribution by GSRTC to the tax receipts of overnment and in view of the urgent need to make the large number of kutcha ich State Transport Services are operated motorable throughout the year, it is atleast 20 per cent of the tax revenue contributed by the GSRTC, *i.e.*, Rs. 16 crores Plan and Rs. 28 crores during the Sixth Plan are earmarked for development of operated by GSRTC. Priorities for undertaking road works on these routes will be

prepared by GSRTC and forwarded to the District Panchayats and Public Works Department from year to year for inclusion in the plans for road development.

2.4.11 The powers of the Corporation as laid down under Section 19 of the Road Transport Corporation Act do not permit the Corporation to incur expenditure either for construction of new roads or for maintenance and repairs of roads on which it operates its services. In a transport organisation the cost of operation depends considerably upon the condition of roads on which the services are operated. The improvement in the condition of roads results in sizeable economies in the cost of operation. In view of the large number of kutcha roads operated by the Corporation it is essential that the Road Transport Corporation Act is amended so as to enable the Corporation to undertake maintenance and repairs of kutcha roads and to undertake construction of new roads whenever the traffic on kutcha roads is very heavy and a large number of trips are operated. In the ex-Bombay State, the then Bombay State Road Transport Corporation had in fact constructed a cement concrete road between Nadiad and Dakor at a cost of Rs. 22 lakhs. The construction of this road has resulted in substantial savings in the cost of operation for services operated on this road. The amendment of the Road Transport Corporation Act would facilitate the taking up of such road works as are important to the Corporation from the operational point of view during the Fifth Plan and the early years of the Sixth Plan.

CHAPTER III

METHODOLOGY

3.1 After its formation in May, 1960 the Corporation has observed that the passenger traffic on roads in the State has been increasing at the rate of 15 per cent per year. To cater to the above increase in traffic, it is necessary to increase the number of schedules operated at the rate of 10 per cent while the balance of the increase can be catered to by improving the operational efficiency *viz.*, by increasing the vehicle utilisation, the fleet utilisation and seating capacity of the fleet. Thus in the last 11 years the passenger kms. travelled have increased at the compound rate of 14 7 per cent per year and the effective kms. operated by the Corporation have increased at the rate of 12.1 per cent per year.

3.2 Since passenger travel is related to the economic activity of the population, an attempt was made to find out the relation between the growth of passenger traffic and the State income in the past. As the development of roads also leads directly to an increase in traffic by road, the effect of road development on passenger traffic in the State was also studied. To study the above relationships in consultation with Dr. Samuel Paul of the Indian Institute of Management, Ahmedabad, the following models showing the relationships between growth of passenger traffic and the above economic indicators were fitted to the past data for nine years—1960-61 to 1968-69 :—

(1) An exponential curve $y=AB^x$ indicates a constant ratio of change, *i e*, for a unit increase in x, y, increases by ratio=B. Hence, for a unit change in x, y, increases or decreases, by a constant percentage. In the case of this curve the relative growth rate, *viz.*, $\frac{1}{y} \times \frac{dy}{dx}$ is constant. The above model was fitted taking the effective kms. as dependent variable and taking independent variables as time and road length respectively.

(2) A simple regression equation $y=a+bx$ was also fitted taking effective kms. as dependent variable and the State income at current prices and road length as independent variables.

(3) A multiple regression equation with effective kms. as dependent variable and State income at current prices and road length in kms as independent variables was fitted.

(4) The Parctoes curve $y=Ax^b$ indicates that the relative growth rate $\frac{1}{y}\frac{dy}{dx}$ is not constant, but varies as $\frac{1}{x}$ *i. e*, as x increases, the relative growth rate decreases. The above model was fitted with effective kms. as dependent variable and State income at current prices and road length as independent variables.

3.3 In all the above models the figures of State income at current prices were used instead of figures of State income at constant prices on account of the following reasons :—

The rates of fares charged by the Corporation have increased at a much smaller rate than the increase in the general price level. Further, the Corporation is catering mainly to the passenger traffic in rural areas and hence it is felt that the income at current prices would have a closer relation with the intensity of travel. The regression equations fitted with State income at current prices and at constant prices also indicated that the equation fitted with State income at current prices gave a better fit. In view of these considerations the f[illegible] of State income at current prices were used in all the models mentioned

3.4 The estimates of index number of effective kms. likely to be operated by the Corporation in 1983-84 with base 1960-61, using the above models were calculated and the results are shown in Appendix B. It was found that the index of effective kms. as worked out by the Corporation using 10 per cent increase in schedules agreed closely with the figures worked out from the following four models.

(1) Index worked out from the exponential model using time as independent variable, which is in fact the model followed by the Corporation for increasing the schedules. However, the index of effective kms. worked out from this model for 1984 was higher at 1671 against 1140 projected for 1984 as per estimates for the Fifth and Sixth Plan based on 10 per cent expansion in schedules per year on account of the lower rate of growth of schedules at 8 percent per year likely to be achieved during the Fourth Five Year Plan on account of shortage of funds.

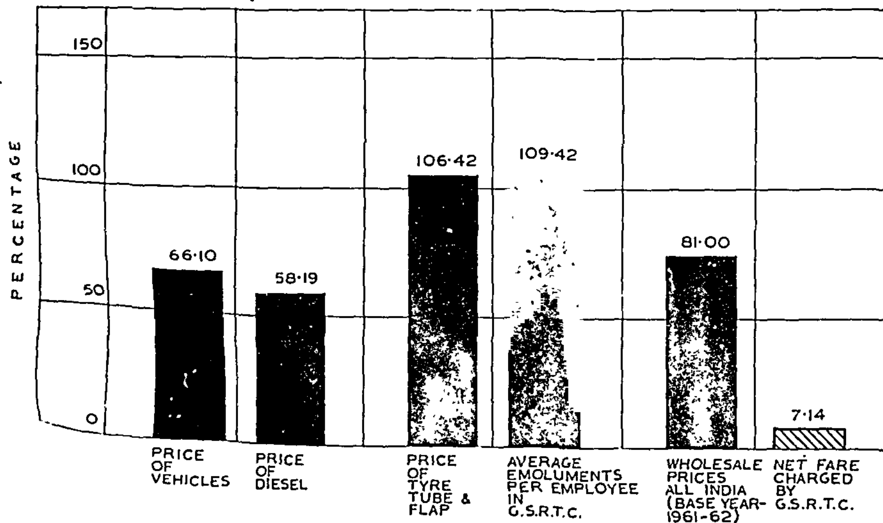
(2) The index worked out from the multiple regression equation using State income at current prices and road length as independent variables.

(3) Simple regression equation with State income as independent variable.

(4) Paretoes curve with road length as independent variable.

3.5 In case of other three models the indices worked out showed either a very high growth rate or a very low growth rate depending upon the nature of curve fitted. In the case of all models the indices of correlation between the actual values of the dependent variable and the values estimated by the model were very high as shown in Appendix B. In the light of these results and on the basis of the experience of the Corporation regarding growth of traffic in the past eleven years, it was decided to estimate the requirements of vehicles by the Corporation in the Fifth and Sixth Plans on the basis of annual growth of 10 percent in the number of schedules operated. The above estimates of requirements of vehicles have been worked out at the existing level of L. F. in State Transport buses which is 73 per cent for the year as a whole. When the overall L. F. remains at the above average level, on some of the routes the level is naturally much higher, particularly in summer period and causes inconvenience to the travelling public. In view of the paucity of funds, it has not become possible to work out the requirement of funds for the plan on a basis of reduced L. F. as every 1 per cent reduction in L. F. increases the requirement of funds for purchase of vehicles by about 1.4 per cent for the existing fleet as well as for vehicles to be purchased for expansion during plan period.

PERCENTAGE INCREASE IN PRICES OF IMPORTANT ITEMS AND NET FARES IN MARCH 1971 COMPARED TO MAY 1960.
(WHEN CORPORATION WAS FORMED)



CHAPTER IV

DEVELOPMENTS DURING THE FOURTH FIVE YEAR PLAN

4.1 As mentioned earlier the size of the Fourth Five Year Plan approved by the State Government provides for a net capital expenditure of Rs. 12.64 crores and an expansion in schedules at the rate of 4.75 per cent per year. The Corporation however, noted that the increase in passenger traffic in the State continued to be very high and so it was essential to increase the number of schedules atleast at the rate of 8 per cent per year. The Corporation has, therefore, requested the State Government to increase the size of the Fourth Five Year Plan for GSRTC to facilitate expansion in schedules atleast at the rate of 8 per cent during the three years 1971-72 to 1973-74 of the Fourth Five Year Plan. In the first year of the Fourth Five Year Plan the Corporation could increase the number of schedules operated at the rate of 7.5 per cent while during the second year the expansion was restricted to only 4 per cent. Appendix C shows the details of capital expenditure likely to be incurred by the Corporation during the Fourth Five Year Plan and the actual achievements during the Second Five Year Plan, Third Five Year Plan and three Annual Plans Appendix D shows the physical achievements likely to be realised during the Fourth Five Year Plan and the actuals for the Second Five Year Plan, Third Five Year Plan and during the three Annual Plans.

CHAPTER V

OBJECTIVES AND POLICIES FOR THE FIFTH AND SIXTH PLANS

5.1. After its formation, GSRTC has given a high priority for extending the net-work of its services throughout the State by opening of new routes even in remote areas. The Corporation also increases the frequency of services on routes taken over by it, to cater to the increase in traffic from year to year. At present the Corporation provides direct services to 11499 towns and villages, *i. e.*, 61.28 per cent of the total number of towns and villages in the State. Steps are now being taken to provide direct services to the remaining villages by stages. The main difficulty in providing direct services to these villages is the lack of motorable roads connecting these villages. With the development of roads in the Fifth and Sixth Five Year Plans the Corporation expects to provide direct services to all villages in the State by the end of the Sixth Five Year Plan.

5.2 During the past 11 years the Corporation concentrated its attention mainly on increasing the transport facilities in the State and therefore bulk of the capital expenditure incurred by the Corporation, *i. e.*, over 80 per cent was spent on purchase of vehicles. In the circumstances the Corporation could not provide sufficient funds to increase the amenities to the travelling public in the form of bus stations, canteens, retiring rooms, etc. With the growing traffic in the State and completion of nationalisation, there is a continuous demand from the travelling public for increasing these amenities which are very essential for comfortable travel. It is, therefore, proposed to provide sufficient funds for construction of modern bus stations at 30 important traffic centres in the Fifth Plan and 30 in the Sixth Plan. It is also proposed to improve the design of bus stations so as to provide for spacious waiting halls, canteens, retiring rooms for the travelling public and cool drinking water. The improved type of bus station is expected to cost Rs. 6 lakhs each. At the end of the year 1970-71 the Corporation had constructed 38 permanent bus stations in the State at important traffic centres. At the end of the Fourth Five Year Plan, the number of permanent bus stations is expected to increase to 50. With the addition of 60 bus stations in the Fifth and Sixth Plans, the total number of permanent bus stations in the State will increase to 110 covering all district headquarters, places of tourist interest and important traffic centres.

5.3 At present the Corporation provides facilities of bus stations constructed in temporary buildings at a cost of about Rs. 50,000 each at 109 places in the State. During the Fifth and Sixth Five Year Plans the number of temporary bus stations will be increased so as to cover all the 168 taluka places and other traffic centres with moderate intensity of traffic in the State. The facilities for pick-up stands for passengers at en-route places will also be increased during the Plan period.

5.4 At present the Corporation operates luxury services on 17 routes linking important cities of the State with Ahmedabad. With the growth of the economy it will be necessary to increase the number of luxury services during the Fifth and Sixth Five Year Plans. It will also be necessary to put into operation air-conditioned coaches during the Fifth and Sixth Plans.

5.5 The establishments of the Corporation are spread over the entire State and the employees of the Corporation are transferrable from place to place. On account of rising rent and shortage of accommodation experienced in most of the towns and cities, the staff of the Corporation, particularly drivers and conductors, who have to perform hard duties at odd hours have to undergo severe hardships, particularly on transfer. On account of shortage of funds, as pointed out earlier, the Corporation could not provide funds for provision of amenities to its employees by way of housing accommodation. Thus at the end of the year 1970-71, out of a total staff of 27,897 employees, the Corporation could provide housing accommodation to only 1,127 employees which comes to only 4.0 per cent of the total staff. It is, therefore, proposed to construct 1567 staff

quarters during the Fifth Plan and 6,237 staff quarters in the Sixth Plan period so as to cover about 10 per cent of the total staff employed with housing accommodation. It is also proposed to provide the facilities of a well equipped hospital for the employees of the Corporation in Ahmedabad city during the Fifth Five Year Plan period.

5.6 Besides the expansion of services and increase in the amenities to the passengers and to the workers, it will be necessary to pay increased attention for training of personnel, development of research, intensification of safety measures and improvement of the tele-communication system in the Fifth and Sixth Five Year Plans.

CHAPTER VI

CRITERIA FOR INVESTMENT OF PLAN FUNDS

6.1 Normally, for investment of Plan funds, the following principles are taken into consideration :—

(1) the needs of the people,

(2) the return on investment,

(3) whether the return is quick or after a period of time, and

(4) the employment potential of the investment.

6.2 If these principles are examined with respect to GSRTC, it is felt that investment in GSRTC satisfies all the above conditions and, therefore, GSRTC should get a high priority in the allotment of Plan funds. As already mentioned earlier, the natural rise in passenger traffic on roads in the State has been quite high. As shown in Appendix E, the return to the State Government on the capital invested in the Corporation is as high as 45.83 per cent and the time factor for getting the return is only about 6 months required for getting chassis and building bodies thereon. Further, the Corporation today provides employment to about 28,000 persons in the State and every increase in schedule increases employment by 8 persons. In view of the high priority given by the Government to relieve unemployment, the expansion of GSRTC should be given a high priority while allocating the plan funds.

6.3 The figures in Appendix E are based on the total receipts which accrue to the State Government from investment in GSRTC. It is true that a part of these tax receipts will be spent by the State Government for the development of roads for the benefit of all road users, *viz.*, trucks, buses, private cars, pedestrians and other vehicles including bullock carts. The investment in GSRTC will augment the resources of the State Government for financing such development expenditure.

CHAPTER VII

DEVELOPMENTS DURING THE FIFTH AND SIXTH FIVE YEAR PLANS

7.1 Vehicles

7.1.1 As mentioned earlier, the passenger traffic on roads in the State has been increasing at the rate of about 15 per cent per year for the last 11 years. It is expected that the same trend of increase in traffic will continue during the Fifth and Sixth Five Year Plans. To cater to an increase in traffic of the order of 15 per cent, it is essential to increase the number of schedules operated at least by 10 per cent every year, the balance of the increase in traffic being catered to by increasing the seating capacity of the fleet and increase in vehicle utilisation, both of which have limitation. The details of requirements of funds and physical targets for the Fifth and Sixth Five Year Plans for expansion at 10 per cent per year are given in Appendix F attached.

7.1.2 It will be necessary to purchase 2,912 vehicles for expansion of services during the Fifth Plan and 4688 vehicles during the Sixth Plan The purchase of vehicles would, therefore, require an investment of Rs. 27.48 crores in Fifth Plan and Rs 47.44 crores in Sixth Plan.

7.1.3 Further, it is expected that 3,022 vehicles will complete their prescribed life and come up for replacement in the Fifth Plan and 5,012 vehicles in the Sixth Plan. The expenditure for replacement of these vehicles amounting to Rs. 28.48 crores in the Fifth Plan and Rs. 50.70 crores in the Sixth Plan will be financed from the internal resources of the Corporation.

7.2 Civil Works : Construction of Depots, Divisional Workshops and Divisional Offices

7.2.1 When the size of a division in terms of number of schedules operated by a division increases beyond a reasonable limit, it becomes difficult to carry on the operations efficiently and hence it becomes necessary to open a new divisional unit by realigning the existing units. After a detailed study of the subject, the Corporation has decided that it is necessary to open a new division when the number of schedules operated increases beyond 400 schedules in Summer Time Table. With the increase in the size of the existing divisions on account of expansion, it is felt that it will be necessary to open 2 divisional units in the remaining 2 years of the Fourth Plan period, 7 units in the Fifth Five Year Plan period and 11 units in the Sixth Five Year Plan period. At present the Corporation has 10 divisional offices in the State which operate 3,223 schedules. At the end of the Fourth Plan the Corporation is expected to operate 4,050 schedules with 12 divisional units; at the end of the Fifth Five Year Plan, 6,538 schedules with 19 divisional units and at the end of the Sixth Five Year Plan, 10,529 schedules with 30 divisional units. Provision has, therefore, been made for the construction of divisional workshops and divisional offices for the new units likely to come up.

7.2.2 Similarly, when the number of schedules operated by a depot increases beyond 50 schedules, it becomes difficult to run the depot efficiently. The size of a number of depots in the Fifth and Sixth Five Year Plan periods will increase beyond 50 schedules on account of expansion of services. It will, therefore, be necessary to open 16 more depots in the remaining 2 years of the Fourth Five Year Plan period; 61 depots during the Fifth Five Year Plan period and 100 depots during the Sixth Five Year Plan period. At present, the Corporation is operating 3,223 schedules from 85 depots which are expected to increase to 4,050 schedules with 102 operating centres at the end of Fourth Plan, to 6,538 schedules with 163 operating centres at the end of the Fifth Plan and 10,529 schedules with 263 operating centres at the end of Sixth Plan. Provision has been made for the construction of depot workshops for the new units likely to come up during the Fifth and Sixth Five Year Plans.

(Bk) B-50—51

7.2.3 The Corporation has at present one Central Workshop which attends to body building on new chassis, heavy repairs of vehicles and reconditioning of major assemblies. With the expansion of the fleet during the Fifth and Sixth Five Year Plan periods, it will be necessary to open at least one regional workshop in each Plan period to cater to the requirements of the increased fleet. Further, it will also be necessary to increase the capacity of the Central Workshop in both the Plan periods. Provision has, therefore, been made for the construction of regional workshop in each Plan period and for strengthening of the Central Workshop during both the Plan periods. Provision has also been made for the construction of a Central Office building for the Corporation during the Fifth Plan period.

Bus Stations

7.3 The capital cost for construction of 30 permanent bus stations in each Plan period will be Rs. 180 lakhs in Fifth Plan as well as Sixth Plan.

7.4 Staff Quarters

7.4.1 At the end of the Fourth Five Year Plan, the total number of employees of the Corporation is expected to increase to about 35,000 and the number of staff quarters to about 1,600 which would meanc overage of about 4.5 per cent of the total staff. During the Fifth Five Year Plan period it is proposed to construct 1,567 staff quarters and increase the percentage of total staff covered to 5.5 percent. During the Sixth Five Year Plan period, it is proposed to construct 6,237 staff quarters which would increase the percentage of total staff provided with housing accommodation to 10.2 per cent. It is also proposed to provide the facilities of a well equipped hospital for the employees of the Corporation in Ahmedabad during the Fifth Five Year Plan period.

7.4.2 The capital requirements for the above civil works are assessed at Rs. 9.20 crores during the Fifth Plan and Rs. 17.04 crores in the Sixth Plan as shown in Appendix G. The cost of land is estimated at Rs. 2.20 crores during the Fifth Plan and Rs. 4.20 crores in the Sixth Plan.

7.5 Plant and Machinery

The requirements for plant and machinery are estimated at Rs. 1.00 crore for Fifth Plan and Rs. 1.25 crores for Sixth Plan.

The total development expenditure is thus assessed at Rs. 39.88 crores and Rs. 69.93 crores for Fifth and Sixth Plans respectively.

7.6 Resources for Financing the Plans

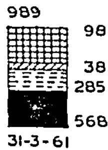
7.6.1 It is estimated that 3,022 vehicles will come up for replacement during Fifth Plan and 5,012 vehicles during Sixth Plan. For replacement of these vehicles, the Corporation will have to incur an expenditure of Rs. 28.47 crores during the Fifth Plan; (Rs. 22.43 crores original price of these vehicles and Rs. 6.04 crores the difference between the original price and the expected purchase price of these vehicles) and Rs. 50.70 crores in the Sixth Plan (Rs. 45.69 crores original price plus Rs. 5.01 crores increase in price). After providing for replacement of these vehicles, the internal resources of the Corporation available for development expenditure are assessed at Rs. 7.14 crores and Rs. 18.06 crores for Fifth and Sixth Plan respectively. As shown in Appendix F, the balance of the capital requirements would have to be obtained by capital contribution of Rs. 21.83 crores from the State Government and a matching contribution of Rs. 10.91 crores from the Central Government during Fifth Plan and Rs. 34.58 crores from the State Government and a matching contribution of Rs. 17.29 crores from the Central Government during Sixth Plan.

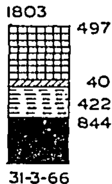
7.6.2 The Corporation has raised three public loans amounting to Rs. 322 lakhs. These loans are due for repayment in the Fifth and Sixth Plans. It may be necessary to raise fresh loans from open market in the Fifth and Sixth Plans, if adequate capital contributions are not available from the participating Governments.

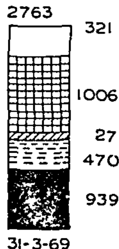
GROWTH OF CAPITAL
BY RESOURCES BY THE END VI PLAN

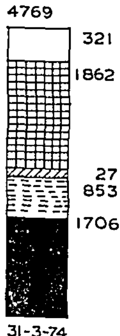
SOURCES

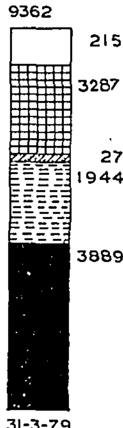
1. STATE GOVT.
2. CENTRAL GOVT.
3. CANADIAN AID LOAN.
4. INTERNAL RESOURCES.
5. PUBLIC LOANS.













RUPEES IN LAKHS.

7.7 Other Schemes :

Besides schemes involving capital expenditure mentioned above, the Corporation will undertake the following programmes in the spheres of staff training, research, promotion of safety measures, etc., during the Plan period.

7.8 Training, Research and Management Development

7.8.1 The Corporation at present employs about 28,000 workers including 15,000 drivers and conductors, about 3,000 other traffic supervisory staff, about 7,000 workshop and maintenance staff and about 3,000 administrative staff. The Corporation has made arrangements to conduct refresher courses for training of drivers and important categories of workshop staff. The Corporation also deputes its officers for training in short term courses conducted by the management institutes, industrial engineering institutes and the Institute for Training and Research for Road Transport. However, with a view to impart pre-service and in-service training to staff at all levels, it is proposed to establish a Training Institute during the Fourth Plan period. In the Fifth and Sixth Plan periods the facilities for training will have to be strengthened.

7.8.2 The Corporation has recently sanctioned nucleus staff for undertaking research concerning the various aspects of operations of the Corporation. The possibility of preparing time tables on a computor is also being examined in consultation with the Indian Institute of Management, Ahmedabad. The hiring of a computor for preparation of time tables, control of inventory, control of consumption of spare parts and for traffic studies will be necessary during the Perspective Plan period.

7.9 Personnel Requirements

The types of personnel needed in the road transport industry are mostly drivers, conductors, mechanics and supervisors. The increase in the number of schedules to be operated in the Fifth and Sixth Plans are placed at 2,478 and 3,991 respectively. The requirements of additional drivers in the Fifth Plan will, therefore, be about 6,000 and in the Sixth Plan about 9500 The GSRTC has already introduced a scheme of pre-service and in-service training of drivers and hence shortage of personnel in the category of drivers is not likely to be experienced. As regards technical personnel the Corporation employs 0.63 skilled and 0 56 semi-skilled auto-mechanics including other ancillary trades per schedule. On this basis the requirement of skilled auto-mechanics would be 1,600 in the Fifth Plan and 2,500 in the Sixth Plan and that of semi-skilled auto-mechanics, 1400 in the Fifth Plan and 2200 in the Sixth Plan. As regards higher qualified technical personnel, the requirement may be about 75 in officers' cadre in the Fifth Plan and 115 in the Sixth Plan.

7.10 Safety Measures

7.10.1 Since its inception from 1st May 1960, GSRTC is alive to the problem of accidents and it has been a constant endeavour on the part of the Corporation to reduce the incidence of accidents. As a result of these sustained efforts, the rate of accidents per lakh kilometres which was 1.06 in the year 1959-60, progressively reduced to 0.50 in the year 1970-71.

7.10.2 The Corporation has taken various steps in different directions for this purpose. So far as drivers are concerned, the Corporation has laid down a recruitment policy under which only experienced drivers who successfully pass a trade test in driving are called. Before appointment, they are required to undergo medical examination and even during the tenure of their service, they are required to undergo medical test for eye sight, whenever required. The selected drivers are imparted pre-service training for about a week. While in service, special refresher training courses in driving are conducted for them. Various instructions of safe driving in special circumstances such as reversing a vehicle, going over an unmanned level crossing, etc., are issued to them. Booklets on these instructions are printed and given to individual drivers. A special machinery is created to check the implementation of these instructions, and where they are not followed, the drivers are adequately punished. In order to

bring home to the drivers the importance of safety, certain educative measures are also taken. The officers of the Corporation hold periodical meetings of drivers at the depots and explain to them the safety measures in driving. Certain attractive slogans are printed on the vehicle, document which the drivers are required to carry. The Corporation has printed number of posters on prevention of accidents and they are displayed in the rest rooms of the drivers. Film shows are arranged at different depots and films on the subject like "Speed and Safety", etc., are shown to the drivers. On the other hand, so far as vehicles are concerned, it may be stated that the Corporation follows a policy of replacing a vehicle after its stipulated life in kilometers is over. While the vehicle is in service, it has to undergo a rigid programme of maintenance and periodical checking. This ensures that only a roadworthy vehicle in fit condition is sent on line. At the end of the spell of duty, the drivers have to record any defect observed by them in the defect slips of the vehicle so that maintenance staff can give special attention to rectify the same.

7.10.3 However, the Corporation is not satisfied with all these measures already taken. The Corporation desires to further continue its efforts. The Corporation proposes to introduce an incentive scheme for drivers for accident free record. It is further desired to make a study through the Chief Labour Officer whether any difficulties of economic or social nature were a cause for any fatal or major accident. The Corporation also feels that in the modern era, one of the best media for mass instuctions is a film and, therefore, the Corporation proposes to produce its own documentary films for prevention of accidents.

7.10.4 While the Corporation is thus making all efforts to reduce the incidence of accidents, it is suggested that the State Government may kinldly consider helping it by considering road construction and safety education activities. In the case of road construction, it is suggested to consider the following :—

(*a*) Widening, surfacing and proper cambering of roads.

(*b*) Construction of bridges and nallas, etc. Also construction of dwarf walls on both sides of major bridges or in the alternative dwarf stones touching the parapet wall at intervals; or if both of them are not possible, the reinforcement of parapet wall of the bridge be made by providing cross iron bars from the slab itself.

(*c*) Avoiding railway crossings as far as possible by construction of over bridges or underways for vehicular traffic.

(*d*) Removal of traffic hazards.

(*e*) Placing of traffic signs and painting them in fluorescent colour so that they are properly visible during night.

(*f*) Providing ring roads round big cities.

7.10.5 An analysis of fatal accidents in the Corporation in the year 1968 shows that in almost 55 per cent of fatal accidents, children were involved. It is, therefore, felt that education on road safety, if imparted to children in the schools, would go a long way. Simultaneously, education on road behaviour is also necessary for the general public. The Group suggests that the Government may consider the matter of safety of road users and create an appropirate machinery for the same by making special and adequate provisions in the Fifth and Sixth Plans.

Telecommunications

7.11 In a transport organisation, the provision of a good system of telecommunication is essential for efficient administration, providing quick information to the travelling public and for making relief arrangements in cases of breakdowns and in emergencies. The Corporation operates its services through 85 operating centres or depots in the State. Facilities of telephone have been provided at all the depots in the State. The facilities for telex service are at present

available at only four Divisional Headquarters in the State, viz., Ahmedabad, Baroda, Surat and Rajkot. In the circumstances, the linking of the Central Office with all Divisional Offices by hiring telex service is not possible at this stage. The Corporation has been considering this question actively and the preliminary work in this connection shows that wireless communication system is the only answer. Bharat Electronics Ltd. have been contacted and it is proposed to get a pilot survey, for installation of a wireless communication system linking all the operating centres and administrative units of the Corporation, at an approximate cost of Rs. 10,000. In the light of the results of this survey, the installation of wireless facilities in the Fifth and Sixth Five Year Plans will be considered.

Air Pollution

7.12 With the rapid pace of industrialisation, the pollution of air has become a major problem in western countries. In the industrial cities in India, the problem, though not so acute, has assumed a sizeable importance. In USA, research work is still being carried out to develop pollution-free engines. However, it will take years to have them in the market. It is, therefore, not possible to envisage at this stage the operation of pollution-free automobiles in India in the Perspective Plan. This Corporation plies its services mostly in rural areas where the issue of air pollution due to vehicle exhaust gases is not a major problem. The Corporation, however, plies its services in cities like Rajkot, Baroda, Surat, Navsari, where air pollution by automobiles will have to be avoided. The Corporation is aware of the nuisance of smoke and has planned its three-tier maintenance programme to ensure that smoke-free engines only are kept on road as far as possible. Regular top-overhauling of engines, checking of automisers at the interval of 12,000 kms., removal of defective fuel injector pumps in time, attending to engines consuming excessive lubricant oil in time, sending the samples of high speed diesel for test in order to find out if there is any adulteration, etc., are the measures taken by the Corporation to stop emitting of smoke from the exhaust. Instructions have been issued to ground such vehicles as are observed to emit excessive smoke and to set the vehicles right before being put on road. The Corporation is also planning to purchase Hatridge, Bosch or other similar smoke emission checking equipment to spot out the engines emitting smoke which is not visible by naked eye *to ensure against the pollution of air by exhaust gases of the buses*

Luxury Services

7.13 The Corporation has been operating luxury bus services for last few years on 8 routes. It has been decided to introduce luxury services on 9 additional routes during the current year. With the growth of the economy, it will be necessary to increase the number of luxury services during the Fifth and Sixth Five Year Plans. It will also be necessary to put into operation air-conditioned coaches during Fifth and Sixth Five Year Plans.

Internal Tourism

7.14 For the development of internal tourism, the Corporation has been operating special excursion trips to various important places of tourist interest and places of pilgrimage in the State and in Rajasthan during monsoon period. These excursion trips are operated with a concession of 10 per cent in fares. The Corporation also runs its regular services to all important places of tourism in the State. These services of tourist interest will be augmented in the Fifth and Sixth Five Year Plans.

Parcel Traffic

7.15 The Corporation provides facilities for transport of parcels throughout the State and the actual revenue from parcel traffic is of the order of about Rs. 17 lakhs per year. Under the parcel scheme important items for domestic use such as medicines, babyfood, cloth, brassware, etc., are carried by the Corporation in rural areas. The Corporation also provides facilities for transport of vegetables, milk cans, newspapers, as unaccompanied luggage in rural areas. In the Fifth and Sixth Five Year Plans, there will be substantial [illegible] the [illegible] lities for parcel service.

tae State Government in each Plan, may be earmarked for development of kutcha tracks operated by the Corporation. It is also necessary to provide special grant to all District Panchayats at the rate of Rs. 2 lakhs per year for maintenance and repairs of S. T. routes suspended in monsoon.

8.6 Normally, for investment of Plan funds, the following principles are taken into consideration :—

1. the needs of the people,

2. the return on investment,

3. whether the return is quick or after a period of time, and

4. the employment potential of the investment.

If these principles are examined with respect to the development plan of GSRTC, it is felt that investment in GSRTC satistifies all the above conditions and hence GSRTC should get a high priority in the allotment of Plan funds. The contribution of GSRTC to the tax revenues of the State Government by way of passenger tax, M. V. Tax and Sales Tax on diesel, today is of the order of Rs. 8.50 crores per year and is expected to increase to about Rs. 34 crores per year by the end of the Sixth Five Year Plan. Appendix E shows that the investments by the State Government in GSRTC by way of capital contributions bring in a very high return of about 47 per cent which becomes available to the State Government for financing the development programmes of the State including development of roads. In the light of these facts, the Group feels that it is necessary to provide adequate resources for financing the expansion programmes of the Corporation at the rate of at least 10 per cent increase in schedules during the Fifth Five Year Plan and Sixth Five Year Plan.

APPENDIX A

PROGRESS OF OPERATIONAL RESULTS

Item	First Plan (Last year i.e. 1955-56)	Second Plan (Last year i.e. 1960-61)	Third Plan (Last year i.e. 1965-66)	As at the end of three Annual Plans 1968-69	1st two years of Fourth Plan 1969-70	1970-71
1	2	3	4	5	6	7
1. Number of depots	N.A	76	79	83	84	85
2. Number of divisions	N.A	7	9	10	10	10
3. Number of routes .	896	1,774	3,146	4,235	4,651	5,404
4. Route kilometres .	29,364	66,817	1,36,768	1,89,224	3,10,026	2,46,044
5. Fleet held (as on the last day). .	N.A.	1,891	2,733	2,716	3,985	4,057
6. Effective kilometres (in lakhs) .	358 89	728.42	1,410.13	2,023 76	2,114.52	2,453.17
7. Average number of vehicles on road.	N A	1,174	1,875	2,526	2,617	2,896
8. Vehicle utilisation (in kms.) ..	N A.	171.4	207.5	221.3	222 9	233.9
9. Vehicular utilisation (Percentage).	N.A.	68.9	75.6	77.8	74.6	78.5
10. Total traffic earnings (Rs. in lakhs)	N.A.	668.98	1,495.03	2,674.60	2,924.09	3,438.46
11. Earning per kilometre (in paise)	N.A.	91.84	106 03	131.83	138.23	140.17
12. Load factor (Percentage) ..	N.A.	72.90	70.34	70 85	73.01	73.14
13. Average seating capacity ..	N.A.	40.1	44.6	47.5	48.4	48.9
14. Number of passengers carried (in lakhs)	744 43	1,463 90	2,681 40	3,991.30	4,444 36	5,061.66
15. Total number of persons employed.	N.A.	11,512	18,219	23,209	21,704	27,897
16. Capital expenditure as on the last day (Rs. in lakhs). .	N.A.	989.04	1,803.04	2,763.20	2,930 03	3,190.46

N. A. = Not available.

APPENDIX B

ESTIMATES OF INDEX NUMBER OF EFFECTIVE KMS. BASED ON DIFFERENT TYPES OF MODELS FITTED

Sr. No.	Model fitted	Variables	Index of Independent variable in 1983-84 with base 1960-61	Value of 'y' in 1983-84 with base 1960-61	Values of 'a'	'b'	R	R^2	Standard error of 'y'	D.F.	Durbin Watson STAT	T-Ratio of 'a'	T-Ratio of 'b'
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	$y=a+bx$ ..	x=Index of State Income at current prices	1,330.00	1,818	—34.79	1.36	0.96	0.92	16.17	7	2.459	1.59	9.49
2	$y=a+bx$ ..	x=Index of road length	254.66	733	—304.75	+4.08	0.97	0.94	13.41	7	0.792	7.44	11.58
3	$y=AB^x$ *i. e.* $\log y = a+bx$	x=Time	..	1,671	+4.45	+0.12 (B=1.132)	1.00	1.00	1.80*	7	2.207	341.15	53.46
4	do. ..	x=Index of road length	254.66	4,955	+2.31	+0.02 (B=1.02)	0.94	0.88	0.12*	7	0.632	6.34	7.60
5	$Y=a+b_1x_1+b_2x_2$	x_1 =Index of State Income at current prices; x_2 =Index of road length	1 339.00 } 224.66 }	1,234	—202 85	b =0.62 b =2.41		0.97	0.14	6	1.915	—4.62	b_1 3.01 b_2 3.90
6	$y=Ax^b$ *i. e.* $\log y=a+b \log x$	x =Index of State Income at current prices	1,339.00	2,501	—1.07	1.24	0.97	0.94	8.25*	7	2.535	1.97	11.34
7	do. ..	x =Index of road length	254.66	1,565	—8.70	2.90	0.95	0.91	0.11*	7	0.689	5.56	8.80
8	Estimate adopted in Ten Year Plan			1,140									

N. B. 1 All values of R are significant at 1 per cent level.

2 All values of b are sig ificant at 1 per cent level except the value of $b_1=3.01$ which is significant at 5 per cent level.

*S. E. of log. y

APPENDIX C

REQUIREMENT OF CAPITAL OUTLAYS UNDER THE FIVE YEAR PLANS

(Rs. in lakhs)

Items	Second Plan (1956-61) —Actual	Third Plan (1961-66) —Actual	Three Annual Plans (1966-67 to 1968-69) Actual	Fourth Plan (1969-74) Plan Provision	Fourth Plan (1969-74) Revised Estimates	Fifth Plan (1974-79) Estimates	Sixth Plan (1979-84) Estimates
A.—Expenditure by sources.							
1. State Government ..	247.00	300.00	95 00	300 00	766 66	2,182.96	3,457.79
2. Central Government .	141 37	150 00	47 50	150 00	382.48	1,091 48	1,728 89
3. Internal resources for							
(a) Expansion .	147.83	364 00	496.04	500 00	247.95	714.01	1,606.14
(b) Additional cost of replacement of vehicles				314.24	608.53	604 40	501.20
Total (a + b) ..	147.83	364.00	496 04	814 24	856.48	1,318 41	2,307.34
4. Public Loans ..	..	..	321.62	.	..	..	..
Total-A ..	536.20	814 00	960.16	1,264 24	2,005.62	4,592 85	7,494.02
B.—Expenditure by items							
1. Vehicles for							
(a) Expansion ..	N.A.	717.00	760. 1	644 00	948.04	2,748.32	4,743.72
(b) Additional cost of replacement of vehicles *	N.A.			314.24	608 53	604.40	501.20
	(N.A.)	(—)	(—)	(1,445)	(2,039)	(3,022)	(5,012)
Total (a + b) ..	N.A.	717.00	780 11	958 24	1,556.57	3,352 72	5,244.97
2. Land	N.A.	18.00	39 66	55.00	72.25	220 00	420.00
3. Building	N.A.	57.00	120.97	216.00	290.48	920.13	1,704.05
4. Plant, Machinery and Equipments.	N.A.	22.00	19.22	35.00	86 32	100 00	125 00
Total-B ..	536.20	814 00	960.16	1,264.24	2,005.62	4,592.85	7,494 02

* Figures in brackets indicate number of vehicles.

N. A.—Not available.

APPENDIX D

PHYSICAL ACHIEVEMENTS UNDER THE FIVE YEAR PLANS

	Position at the end of					
	Second Plan (1960-61)	Third Plan (1965-66)	Three Annual Plans (1968-69)	Fourth Plan (1973-74)	Fifth Plan (1978-79)	Sixth Plan (1983-84)
1. Number of Divisions	7	9	10	12	19	30
2. Number of Depots	76	79	83	102	163	263
3. Number of Schedules	1,331	2,171	2,715	4,060	6,538	10,520
4. Fleet	1,891	2,733	3,716	5,108	8,020	12,708
5. Effective kms. (in lakhs)	728.42	1,410.13	2,028.76	3,108.62	5,261.85	8,906.56
6. Staff employed	11,512	18,219	23,290	35,697	57,469	92,550
7. Number of permanent bus stations	11	26	35	50	80	110
8. Number of staff quarters	480	630	785	1,600	3,167	9,404
9. Capital expenditure (Rs. in lakhs)	989.01	1,803.04	2,763.20	4,763.82	9,361.67	16,865.69

APPENDIX E

EXPECTED RETURN ON INVESTMENT OF RUPEES ONE CRORE ON VEHICLES IN THE CORPORATION TO THE STATE GOVERNMENT

Amount of investment	Rs.	100.00	lakhs
Average expected price in Fifth Plan	Rs.	94,000	
∴ No. of vehicles which could be purchased Rs. 1,00,00,000 / Rs. 94,000		106	

A—Calculations regarding Passenger Tax,

Average No. of vehicles on road at 75 per cent of the fleet.		80	
Expected average kms. per vehicle on road per day during the year		90,635	
∴ Expected service kms. per annum 90,635×80		72.51	lakh kms.
Expected rate of traffic earnings per km. 150.91 paise.			
∴ Expected traffic earnings	Rs.	109.43	lakhs
Passenger tax at 21.32 per cent of traffic revenue	Rs.	23.33	lakhs
B—Cost on Motor Vehicle Tax at 3.26 paise per km.	Rs.	2.36	lakhs
C—Sales Tax on diesel oil at 1.87 paise per km. (Sales Tax 8 paise per litre/ kilometre per litre 4·28).	Rs.	1.36	lakhs
D—Interest charge at 6¼ per cent..	Rs.	6.25	lakhs
Total A to D	Rs.	33.30	lakhs

∴ Rate of return to the State Government 33.30 per cent.

If the counterpart contribution of Rs. 50 lakhs from the Central Government is also used for purchase of vehicles, then the total return to the State Government would be :—

(a) Passenger Tax	Rs.	35.00	lakhs
(b) M. V. Tax	Rs.	3.54	lakhs
(c) Sales Tax on diesel	Rs	2.04	lakhs
(d) Interest charges	Rs.	6.25	lakhs
Total.	Rs.	46.83	lakhs

∴ The percentage return on investment of Rs. 100 lakhs to the State Government for the year. 46.83 per cent

APPENDIX E

FIFTH AND SIXTH PLAN PERIOD CAPITAL REQUIREMENT, RESOURCES AND PHYSICAL TARGETS

(10 per cent expansion in both the Plans)

Item	Fifth Plan Amount (Rs. in lakhs)	Sixth Plan Amount (Rs. in lakhs)
A.—Capital requirements		
1 Expenditure on vehicles for expansion	2,748.32	4,743.77
(No. of vehicles for expansion)	(2,912)	(4,688)
2 Land	220.00	420.00
3 Buildings	920.13	1,704.00
4 Plant, machinery and equipment	100.00	125.00
Total	3,988.45	6,992.77
B.—Resources		
1 Contribution to depreciation fund	3,636.69	6,976.50
2 Less amount requirement for replacement of vehicles (number of vehicles for replacement).	(3,022)	(5,012)
(a) Amount available from depreciation fund	2,243.28	4,569.16
(b) Additional cost of vehicles due to increase in prices	604.40	501.20
(c) Total (a + b)	2,847.68	5,070.36
Item (1) - 2(c)	789.01	1,906.14
Less amount required for working capital	75.00	100.00
	714.01	1,806.14
(1) Internal resources available for development	714.01	1,806.14
(2) Contribution from State Government	2,182.96	3,457.79
(3) Contribution from Central Government (Railways)	1,091.48	1,728.89
	3,988.45	6,992.82

APPENDIX F—*concld.*

Sr. No.	Item	Position at the end of Fifth Plan	Position at the end of Sixth Plan
	'C' Physical Targets		
1	Number of schedules	6,538	10,529
2	Fleet of buses	8,020	12,708
3	Effective kms. (in lakhs)	5,261.85	8,906.55
4	Staff employed	57,469	92,550
5	Number of divisions	19	30
6	Number of depots	163	263
7	Number of staff quarters	3,167	9,404
8	Capital expenditure (Rs. in lakhs)	9,361.67	16,855.69
9	Number of permanent bus stations	80	

APPENDIX G

PROPOSED CIVIL WORKS

No.	Type of work	Cost per unit (Rs. in lakhs)	Fifth Plan: No. of works	Fifth Plan: Total cost (Rs. in lakhs)	Sixth Plan: No. of works	Sixth Plan: Total cost (Rs. in lakhs)
I—Essential Buildings						
(a)	Regional workshop ..	100.00	1	100.00	1	100.00
(b)	Expansion of Central Workshop	..	..	25.00	..	25.00
(c)	Transport House ..	70.00	1	70.00	..	..
(d)	Divisional Office ..	3.50	7	24.50	11	38.50
(e)	Divisional Workshop ..	12.00	7	84.00	11	132.00
(f)	Depots	2.00	61	122.00	100	200.00
(g)	Welfare Centres ..	1.50	7	10.50	11	16.50
	Total ..			436.00		512.00
II—Amenities to Passengers						
(a)	Bus stations	6.00	30	180.00	30	180.00
(b)	Additions and alterations ..	...	—	30.00	..	30.00
	Total ..			210.00		210.00
III—Amenities to Staff						
(i)	Quarters					
	(a) For Divisional Controller	0.55	7	3.85	11	6.05
	(b) For Sr. D.M.E./D.M.E.	0.55	7	3.85	11	6.05
	(c) Other Class I & II Officers.	0.35	56	19.60	88	30.80
	(d) For Depot Manager ..	0.35	61	21.35	100	35.00
	(e) Class III and IV Staff	0.15	1,436	215.48	6,027	904.15
	Total ..		1,567	264.13	6,237	982.05
(ii)	Hospital for employees ..	10.00	1	10.00	..	..
	Grand Total ..			920.13		1,704.05

Report of the Working Group on Transport and Communications

Part - III

Ports, Harbours and Inland Water Transport

1.5.2 In a developing country such as India, with its abundant raw materials, the ports become the main arteries for the export of raw materials and the import of finished goods. With the rapid industrialisation of the country, the trend of trade has shifted to the import of raw materials and the export of finashed and semi-finished goods. The development of ports has, therefore, become a matter of prominence. It has to be viewed from this aspect and port facilities expanded.

1.6 Development in Advanced Countries

1.6.1 In India, the development of ports and their administrative set up has been based mostly on the British pattern. This may have served its purpose in the past, but the modern trends in the developed countries such as the Western European Countries, U. S. A. and Japan have radically changed this concept. The Ports Administration there have the minimum number of agencies and controls on the movement of the cargo from ship to shore and *vice-versa.* This has been one of the main factors in the phenomenal growth of port based industries, which contribute to the spectacular rise in the traffic passing through the ports.

I

CHAPTER II

PATTERN OF DEVELOPMENT

2.1.0 With the industrialisation of the country, facilities at the ports also has to be expanded. It is the experience all over the world that in the development of ports, the execution of works and the process of modernisation are very slow. The development programme has, therefore, to be drawn up well in advance on the basis of the traffic projections of the future years. In the initial stage of the planned development, this could not be done due to various reasons. The First Five Year Plan was initially an investigation and making up for the war years. During this period, certain basic investigations were undertaken so as to enable the Department to formulate engineering schemes.

2.1.1 In the Second Five Year Plan, investigations for more important engineering works such as the breakwaters at ports like Porbandar and Veraval, hydrographic surveys and engineering model tests were initiated. Only those schemes were undertaken which made good past deficiencies in facilities, so as to make the ports serve the traffic needs better. On the whole, substantial progress could not be made.

2.1.2 In the Third Five Year Plan, better progress could be achieved Landing facilities like jetties and wharves were constructed. Cargo handling equipment like cranes, etc., were procured and the lighterage fleet was augmented. Against a provision of Rs. 435 lakhs both in the State and Central sectors, an expenditure of Rs. 486.84 lakhs was incurred.

2.1.3 During the three Annual Plans, the tempo of progress slowed down. This greatly affected the efficient handling of cargo, although the traffic at the ports increased substantially. An expenditure of Rs. 328.03 lakhs was incurred during the period, both under the State and Central sectors.

2.1.4 The expenditure incurred during the Second and Third Plans, three Annual Plans and the Fourth Plan are given in Appendix A.

2.2 Targets for the Fourth Plan

2.2.1 With the commencement of Fourth Five Year Plan, the ports faced the backlog of *works and expansion of facilities. Some of the improvement schemes which were started in the* Second and Third Plans had spilled over into the Fourth Plan. With the increase in traffic, the facilities at the ports had to be increased. The Development Plan had, therefore, to be drawn up on the basis of the increased volume of traffic estimated at the ports. Before the commencement of the Fourth Plan, the traffic passing through the ports was of the order of 3.8 million tonnes and it was estimated that by the end of the Fourth Five Year Plan, it would increase to 5.5 million tonnes. In order to meet this rate of growth of traffic, plans had to be drawn up for the development and modernisation of the ports, including increase in facilities.

2.2.2 The Fourth Plan schemes of the ports are shown in *Appendix B.* The Central Sector *provision was only for the development of Porbandar as an all weather port.* All other develop*ment schemes were to be financed from the State sector. The major schemes* that were proposed [illegible] down- [illegible] nt, etc., [illegible] nagar and survey and investigation for the development of deep water ports at Dahej at the mouth of the Narmada and Pipavav in the south coast of Saurashtra Region.

2.2.3 The progress made so far (1971) in the achievement of the targets is encouraging. The lighterage port at Dahej is nearing completion. The downstream facilities at Bedi are also in an advanced stage of completion and the dredger is likely to be delivered by the end of 1971-72 at a cost of Rs. 125 lakhs. The target for the purchase of additional lighterage fleet could also have been achieved but for the failure of one of the leading firms of shipbuilders.

2.2.4 The work on the breakwater at Porbandar is also progressing satisfactorily. It is already completed up to a length of 1000 m. and the work on third stage has commenced.

CHAPTER III

TRAFFIC PATTERN

3.1.1 As already stated in the previous chapter, ports serve as a link between the sea-bo ne and land traffic. The development schemes of the ports, *i. e.*, increase in handling facilities as well as modernisation will, therefore, have to be considered on the basis of the traffic that is passing through the ports and the future projections. The volume of traffic passing through the ports of Gujarat from 1954-55 to 1970-71 is given in Appendix C. From 1.60 million tonnes at the beginning of the First Five Year Plan, it reached a figure of 3.20 million tonnes by the end of the Third Plan, a rise of more than 100 per cent. The increasing trend in traffic noticed during the previous Plans is primarily due to industrial expansion in the country as a whole.

3.1.2 Another important factor that contributed to the growth in traffic was the large volume of imports of foodgrains and fertilizers due to the shortfall in agricultural production. The traffic projections during the previous Plans were, therefore, based on this trend. The policy of the Government in respect of the import and export of certain commodities also played a significant part in the traffic pattern of ports Another factor that contributes to these projections is the policy of the importing country. In view of the many factors that contribute to the trends in traffic, traffic projections made on the basis of current policies may not some time materialise.

3.1.3 An important factor that requires to be taken into consideration is that the facilities *at the ports should be planned well in advance of the expectation of the traffic that is likely to* pass through the ports Considering the prospects of future traffic as stated in the above para, the facilities at the ports have to be planned to meet the expected demand It is, therefore, of the utmost importance to carefully forecast the future growth in traffic. This can be done keeping in view only the present import / export polices of the Government, the expansion of the existing industries, the establishment of the new industries in the economic hinterland of the ports and the trend of the import policies of the various traditional importing countries. Recent developments in the world of shipping are also likely to affect the traffic pattern of the ports. The size of ships plying on the high seas is increasing and if our import / export trade has to be sustained and increased, it is necessary either to modernise the facilities of the existing ports *which can cater to the needs of the shipping* or to develop a few selected ports, with required facilities, even if it means diversion of trade from the existing ports.

3.1 4 Considering the above factors, it became necessary to revise the trend of traffic at Gujarat ports during the course of the Fourth Plan period. It became evident at the begining of the Fourth Plan that the traffic projections of the Fourth Plan shall have to be scaled down. On the basis of the experience gained in the last few years, it was estimated that the ports of *of Gujarat will be required to handle 5.50 million tonnes of cargo by the end of* the Plan period. This estimate has been scaled down to 3.50 million tonnes. The major factor was the stoppage of the import of foodgrains and fertilizers because of adequate production of food on account of the "Green Revolution" in the country. There has been variation in other important commodities also which are discussed briefly in the following paras.

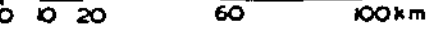
3.1.5 Foodgrains and fertilizer traffic estimated to be 6 lakh tonnes will have to be deleted from the estimate. Mineral oil traffic has to be scaled down from 4.75 lakh to only 4 lakh tonnes. The import of rock phosphate and sulpher is likely to fall from 3 50 lakh tonnes to 1 lakh tonnes only. The export of bauxite and lime stone is likely to decline from 3.50 lakh tonnes to 2 lakh tonnes. Similarly, the export figures for *cement and clinker and salt* are estimated to be only 6 lakh tonnes each, against the anticipation of 15.60 lakh tonnes and 10.70 lakh tonnes, respectively. On the other hand, the import of coal and coke has to be revised upward from 1 lakh to 2 lakh tonnes, the export of oil-cakes and seeds from [illegible]

to 7.50 lakh tonnes and miscellaneous import and export to be increased from 3 lakh to 6.50 lakh tonnes. Thus, the anticipated traffic at the end of Fourth Plan has to be scaled down from 5.50 million tonnes to only 3.50 million tonnes.

3.1.6 Keeping these fluctuations in traffic at the ports of Gujarat in view, the projections of the Fifth and Sixth Plans have to be made carefully. While working on these projections, the traffic generated by major industries which are likely to be established at or near the ports have been taken into account. They are (*i*) Fertilizer Project near Mithapur at Okha, (*ii*) Pig Iron Plant at Bhavnagar, (*iii*) Refinery to be established on the Gujarat coast, (*iv*) Cement Plant on the Gujarat coast, (*v*) the anticipated traffic at the Narmada Deep Water Port, and (*vi*) Cement and Soda Ash Plant near Pipavav. On the basis of the above considerations and the anticipated traffic of other traditional commodities, it is estimated that by the end of Fifth Plan the ports of Gujarat will be required to handle 6.00 million tonnes of traffic, while at the end of the Sixth Plan, it will reach the figure of 7.50 million tonnes. Details are given in Appendix D.

PORTS OF GUJARAT





COASTAL TRAFFIC

JAKHAU

EXPORTS
CALCUTTA
BOMBAY
COCHIN

MANDVI

IMPORTS
DAHANU
BULSAR
OKHA

EXPORTS
BOMBAY
OKHA

IMPORTS
MANGALOR
OKHA

OKHA

IMPORTS
MANDVI

EXPORTS
MANDVI
MUNDRA
COCHIN
MADRAS
CALCUTTA
BOMBAY

IMPORTS
CALICUT

IMPORTS
BOMBAY
CALICUT

EXPORTS
BOMBAY
COCHIN

IMPORTS
BULSAR
JAFRABAD
BHAVNAGAR
PIPAVAV

EXPORTS
BHAVNAGAR

IMPORTS
CALICUT
MANGLORE

IMPORTS
PIPAVAV
JAFRABAD
BHAVNAGAR

IMPORTS
MANGALORE
COCHIN
CALICUT
BOMBAY

EXPORTS
BOMBAY

IMPORTS
BHAVNAGAR
VERAVAL

IMPORTS
PIPAVAV
JAFRABAD
TALAJA

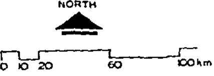
EXPORTS
BHAVNAGAR

LEGEND

SALT	▲	COAL
TIMBER		ANIMALS
CEMENT		DATES
CLAY		CLINKER
OIL CAKES		MACHINERY
BAUXITE		LIME STONE
BUILDING MATERIALS		SULPHUR
GYPSUM		FISH

...WA, OKHAL, VANSIBORSI AND ...
...N BECAUSE THE TRAFFIC
IS VERY SMALL

PORTS OF GUJARAT



CHAPTER IV

PERSPECTIVE PLAN FOR 1974-84

4.1.0 Even though the traffic passing through the ports of Gujarat has shown a downward trend in the beginning of the Fourth Five Year Plan, the prospects of increase in traffic are brighter. This is due to the increased pace of industrialisation in the economic hinterland of the ports of Gujarat. As mentioned in the preceding chapter, *there are prospects of increased* industrial productions in the immediate vicinity of the ports like Okha, Porbandar, Salaya, *Pipavav, Bedi, Bhavnagar and Veraval.* The industries already licensed or envisaged will generate a large volume of traffic of both imports of raw materials and exports of manufactured and semi-manufactured goods. The traffic potential of the ports, at the end of Fifth Five Year Plan is *estimated* at 6.00 million tonnes. Important industries that are likely to be established are listed in the following paras

4.1.1 The present trend in the shipping is quicker turnround of ships loading or unloading at ports. As the ships grow larger, their overheads are *increasing. Shipping companies,* therefore, insist upon greater loading or unloading rates. Previously, an average dispatch of 1,000 *tonnes per day* was considered to be fair. Now, ships, particularly foreign ships, insist on a minimum turnround of 2,000 tonnes per day at the lighterage ports In fact, *in direct* berthing ports, the turnround of up to 3,000/4,000 tonnes per hour is quite common. Most of our ports are lighterage ports. The new trend in shipping of increased loading rate is to be kept in view while formulating the Perspective Plan of ports. For the lighterage ports, this can be achieved by means of increasing the loading points, increasing the fleet of barges and tugs and providing mechanical devices. At direct berthing ports, quicker loading can be achieved by *installing mechanical cargo devices. It is imperative to provide these facilities at ports during* the Fifth and Sixth Plans.

4.1.2 The *more important* industries which are likely to be established near the ports and the traffic potential generated due to these industries are discussed hereafter.

Fertilizers Project near Mithapur

4.1.3 A new fertilizer complex has been sponsored by Tatas near Mithapur It is under*stood that this project amounting to* Rs. 50 crores has been cleared and the department has been assured that in case the new project comes up in the region of Okha port, additional traffic of 7 lakh tonnes is likely to be generated and handled at port Okha. Therefore, during the next two Plan periods, we shall have to take into account this traffic.

Pig Iron Plant at Bhavnagar

4.1.4 *A limited company has been floated in the private sector for* establishing a pig iron plant at Bhavnagar. The required land has also been placed at the disposal of the industry which is located on the port site itself. Initially, the capacity of this plant would be 500 tonnes per day, to be increased to 1,000 tonnes within a period of 2/3 years. For the manufacture of pig iron, iron ore shall have to be imported from Goa by the sea route and part of the coal and coke shall also follow the same route. On account of this, the import traffic would be about 2 lakh tonnes by the end of the Fifth Plan while at the end of the Sixth Plan, it would be 5 lakh tonnes.

Cement Plant at Porbandar (Export Oriented Scheme)

4.1.5 The Cement Corporation of India has decided to establish one more *unit at* Porbandar capable of producing one million tonnes of cement under the Export *Oriented*

Scheme. The volume of traffic likely to be offered by this industry is assessed at 3 lakh tonnes in the Fifth Plan and 4 lakh tonnes at the end of the Sixth Plan. Though the production target is 10 lakh tonnes, the balance may move by rail and road transport.

Crude Oil for Refinery

4.1.6 The present capacity of the refinery in Gujarat will have to be expanded considerebly as the demand for fuel oil is increasing rapidly. This may be done either by expanding the Koyali Refinery or by providing additional refining capacity. The natural source of obtaining crude oil in Ankleshwar fields have limitations and, in the not too distant future, crude oil may have to be imported. The total import of crude oil may be much more but due to insufficient information on this score it is assessed at 14 lakh and 15 lakh tonnes, respectively, on a conservative estimate, by the end of Fifth and Sixth Five Year Plans.

Cement and Soda Ash Plants near Pipavav

4.1.7 Saurashtra region is a very favourable area for the expansion of the heavy chemical industry. A firm in Bombay is conducting a survey of the potential for soda ash and cement plants at Pipavav. Initial reactions are favourable. This industry will also most exclusively depend on the port facilities nearby. Pipavav will be the nearest port for the traffic generated by these industries which is estimated to be of the order of 0.6 million tonnes in the initial stages, with prospects for expansion in the future.

4.1.8 The establishment of petro-chemical industries in the Baroda complex is expected to come as a boost for the intensive industrial development of the region. The agriculture production in the region, benefitted by the large sized multi-purpose projects like Kadana and Ukai in Gujarat State and various schemes of Narmada Valley development in Gujarat and Madhya Pradesh, etc., will increase manifolds. All these developments in the economic hinterland of the port at the mouth of the Narmada will provide a large potential of traffic not only by rail and road, but also by sea.

4.1.9 The Institute of Foreign Trade, New Delhi, has recently conducted a traffic potential and feasibility study of the port of Narmada (Dahej). While assessing the traffic potential, the conclusions reached by the Institute have been taken into consideration. These recommendations are reproduced in brief as under :—

On the basis of a study of the economic and industrial development of the State as a whole and the hinterland of the proposed port at the mouth of the Narmada comprising of (*a*) Central and South Gujarat regions in the immediate hinterland of the port, (*b*) North Gujarat region for the flow of bulk commodities, and (*c*) Developed regions of either States—Madhya Pradesh, U.P., Rajasthan, Delhi, Hariyana and Himachal Pradesh, the assessment of traffic likely to be handled at the proposed port of Narmada is as under :—

	Commodity (*C = Coastal, F = Foreign)		Imports in lakh tonnes	Exports in lakh tonnes
1	Agricultural production	(C & F)*	..	1.00
2	Salt and salt products	(F)	..	1.00
3	Manganese	(F)	..	0.80
4	Fluorite	(C & F)	..	0.65
5.	Cement	(F)	..	0.50
6.	Chemicals	(C)	..	0.50

	Commodity				Imports in lakh tonnes	Exports in lakh tonnes
7.	Sulphur ..	(C) ..	..	..	..	0.35
8.	Nitrogenous fertilizers	(C) ..	..	..	..	0 50
9.	General cargo	(F) ..	..	..	..	0.25
10.	Coal and coke ..	(C) ..	..	.	2.00	..
11.	Rock phosphate	(F) .	..	..	1 65	..
12.	Iron and steel	(C) ..	..	..	0.50	..
13.	Machinery and miscellaneous items	(C&F)	..	..	0.50	..
					4.65	5.55

Total : Imports + Exports .. .. .. 10 20 lakh tonnes

The information obtained from the above referred study is gratefully acknowledged.

4.2 Based on the trends indicated in the preceding paras, the existing facilities of the ports will have to be expanded during the Fifth and Sixth Plans and new ports at (*i*) the mouth of the Narmada, (*ii*) Salaya and (*iii*) Pipavav will have to be constructed.

4.3 Basic Objectives

4.3.1 Although raw materials and power are the principal infrastructures for industrial development, availability of economical means of transport plays a decisive role in industrialisation. The phenomenal development of ports in Japan and Western Europe have played a decisive role in the unprecedented industrial expansion. With the limitations on the expansion of railways, both due to physical factors and the huge financial outlay needed, and the uneconomic cost of road transport for bulk commodities, the sea route provides the only means of economic and speedy means of transport. Along with the planning of industrial expansion, it is imperative to consider the development of port facilities. These basic considerations have been taken into account in planning the port development for the future Plans.

4 3.2 The physical conditions of the ports and limited scope of expansion due to technical reasons limit the expansion of facilities at some of the existing ports of Gujarat. Many of the ports of Gujarat cannot be provided with modern means of alongside facilities for easy and economical handling facilites and goods have to be moved from ship to shore and *vice versa* by means of lighters The present day trend is to load or unload ships in the quickest possible time. The loss of salt export to Japan was due to the slower rates of loading at our ports. Keeping this past experience in view, the future development Plans have to be drawn up so as to achieve faster rates of loading by providing additional suitable shore structures and increase in and modernisation of lighterage fleet and cargo handling equipment at the existing ports

4.3 3 Wherever new port sites have to be developed, the minimum requirement to be [illegible] in view is the direct berthing facilities for deep drafted vessels to provide [illegible] economical means of transhipment between shore and ship. The new sites at the [illegible] mouth of the Narmada, Salaya and Pipavav are proposed to be developed as ports.

4.3.4 As pointed out in the previous chapters, the completion of port development projects takes considerable time as the working conditions are subject to adverse natural conditions like tides, storms, floods, etc. It is, therefore, desirable to plan construction of new structures and of provision of additional equipment well in advance of the actual traffic needs. One of the basic objectives of the future plans is, therefore, the necessity of providing the required facilities in anticipation of the projected traffic needs.

4.3.5 Mention has also been made about the ever increasing size of vessels for which facilities have to be provided. Applying these considerations to the existing direct berthing ports, which are designed for small draft vessels, it will be obvious that depths at these ports have to be increased to the maximum extent possible by dredging the creeks, the approach channels and the turning basins. Similarly, in the case of lighterage ports, the present bottlenecks of shallow depths at the berths, jetties, creeks and the existence of bars which reduce the operational capability of the lighterage fleet, shall have to be dredged in order to increase the efficiency of the lighterage fleet and also to put them to optimum use. The necessity of additional dredger and capital dredging at many of the ports of Gujarat are, therefore, some of the basic objectives of future Plans.

4.3.6 As already mentioned, the completion of port development schemes takes a long time. The schemes proposed in the Fourth Plan are likely to spill over into the Fifth Plan. Similarly, some of the schemes of the Fifth Plan are likely to spill over into the Sixth Plan. Provision, therefore, has to be made for expenditure of the spill over schemes in both the Plans.

4.3.7 During the Fifth and Sixth Plans, the ports of Gujarat will be required to handle 6.00 million tonnes and 7.50 million tonnes respectively. The development plans are, therefore, drawn up keeping in view the expected traffic to be handled at these ports. The detail schemes for each port are discussed in the following paragraphs.

4.4 Fifth and Sixth Five Year Plans

4.4.1 On the basis of the considerations of the preceding chapters, the development plan of ports in the Fifth and the Sixth Plans have been drawn up.

These are as under:—

(*i*) Development of new deep water sheltered ports.

(*ii*) Schemes to increase the efficiency of present port working, harbour expansion, electrification of cranes, better transport facility, etc.

(*iii*) Mechanical handling of bulk cargo such as salt / bauxite.

(*iv*) Navigational aids for night navigation.

(*v*) Providing lighters and tugs/launches for quick transport of goods between ship and shore.

(*vi*) Dredgers and dredging for maintaining water depths.

(*vii*) Marine surveys and investigation, model testing, research, etc.

(*viii*) Modernisation and expansion of port workshops—purchase of modern equipment and appliances, including dry-dock and slipway facilities.

(*ix*) Approach roads, railway sidings, water supply and electrification, etc.

(*x*) Training of personnel.

(*xi*) Labour welfare and housing.

4.4.2 The general nature of the development of important ports is mentioned below :—

Navlakhi

(1) General improvement of the present port facilities, including the extention of the wharf and the purchase of additional flotilla. Construction of residential quarters for staff and improvement of workshop facilities.

Bedi

(2) Further stage development of extended landing facilities, including purchase of additional flotilla, dredging, construction of staff quarters and expansion of workshop facilities.

Salaya

(3) Creating facilities for crude oil imports for 200,000 D. W. T. (Bulk carriers).

Okha

(4) General improvement of navigation including dredging of approach channel and alongside berths and providing a separate oil tanker mooring berth. Expansion of workshop facilities and installation of night navigation facilities.

Porbandar

(5) Providing facilities of additional berth, storage godowns, flotilla units, electriccranes and navigational aids. Under Central sector scheme, it is proposed to provide additional alongside facilities as well as spill over works of the Fourth Five Year Plan.

Veraval

(6) Purchase of flotilla and improvement of other port facilities, including workshop.

Pipavav

(7) Facilities of deep water direct berthing all weather port along with essential port facilities.

Mahuva

(8) Purchase of additional flotilla units.

Bhavnagar

(9) Purchase of additional flotilla units, dredging, providing night navigation and construction of staff quarters.

Port of Narmada

(10) Creating a dry cargo port at mouth of the Narmada with essential port facilities for deep drafted vessels.

Other Minor Ports

(11) Addition to flotilla units for cargo movement and improvement of the present port facilities.

4.3.4 As pointed out in the previous chapters, the completion of port development projects takes considerable time as the working conditions are subject to adverse natural conditions like tides, storms, floods, etc. It is, therefore, desirable to plan construction of new structures and of provision of additional equipment well in advance of the actual traffic needs. One of the basic objectives of the future plans is, therefore, the necessity of providing the required facilities in anticipation of the projected traffic needs.

4.3.5 Mention has also been made about the ever increasing size of vessels for which facilities have to be provided. Applying these considerations to the existing direct berthing ports, which are designed for small draft vessels, it will be obvious that depths at these ports have to be increased to the maximum extent possible by dredging the creeks, the approach channels and the turning basins. Similarly, in the case of lighterage ports, the present bottlenecks of shallow depths at the berths, jetties, creeks and the existence of bars which reduce the operational capability of the lighterage fleet, shall have to be dredged in order to increase the efficiency of the lighterage fleet and also to put them to optimum use. The necessity of additional dredger and capital dredging at many of the ports of Gujarat are, therefore, some of the basic objectives of future Plans.

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4.3.7 During the Fifth and Sixth Plans, the ports of Gujarat will be required to handle 6.00 million tonnes and 7.50 million tonnes respectively. The development plans are, therefore, drawn up keeping in view the expected traffic to be handled at these ports. The detail schemes for each port are discussed in the following paragraphs.

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(*iv*) Navigational aids for night navigation.

(*v*) Providing lighters and tugs/launches for quick transport of goods between ship and shore.

(*vi*) Dredgers and dredging for maintaining water depths.

(*vii*) Marine surveys and investigation, model testing, research, etc.

(*viii*) Modernisation and expansion of port workshops—purchase of modern equipment and appliances, including dry-dock and slipway facilities.

(*ix*) Approach roads, railway sidings, water supply and electrification, etc.

(*x*) Training of personnel.

(*xi*) Labour welfare and housing.

4.4.2 The general nature of the development of important ports is mentioned below :—

Navlakhi

(1) General improvement of the present port facilities, including the extention of the wharf and the purchase of additional flotilla. Construction of residential quarters for staff and improvement of workshop facilities.

Bedi

(2) Further stage development of extended landing facilities, including purchase of additional flotilla, dredging, construction of staff quarters and expansion of workshop facilities.

Salaya

(3) Creating facilities for crude oil imports for 200,000 D. W. T. (Bulk carriers).

Okha

(4) General improvement of navigation including dredging of approach channel and alongside berths and providing a separate oil tanker mooring berth. Expansion of workshop facilities and installation of night navigation facilities.

Porbandar

(5) Providing facilities of additional berth, storage godowns, flotilla units, electriccranes and navigational aids Under Central sector scheme, it is proposed to provide additional alongside facilities as well as spill over works of the Fourth Five Year Plan.

Veraval

(6) Purchase of flotilla and improvement of other port facilities, including workshop.

Pipavav

(7) Facilities of deep water direct berthing all weather port along with essential port facilities.

Mahuva

(8) Purchase of additional flotilla units.

Bhavnagar

(9) Purchase of additional flotilla units, dredging, providing night navigation and construction of staff quarters.

Port of Narmada

(10) Creating a dry cargo port at mouth of the Narmada with essential port facilities for deep drafted vessels.

Other Minor Ports

(11) Addition to flotilla units for cargo movement and improvement of the present port facilities.

Construction of Office Buildings and Staff Quarters at Various Ports

(12) Essential needs of housing for staff and other administrative buildings will be provided.

Dredger and Dredging

(13) It is proposed to purchase following three dredgers:—

(*i*) Rock-breaker dipper dredger.

(*ii*) Cutter suction dredger.

(*iii*) Grab dredger.

The cost of capital dredging is included in this scheme.

Survey of Gujarat Coast

(14) Purchase of full fledged survey launch is envisaged. The cost of carrying out investigations for the location for new harbours and surveys of approaches of new sites are included in this scheme.

4.4.3 The details of the schemes and the proposed outlay during the Fifth and Sixth Plans are shown in Appendix E.

CHAPTER V

FINANCIAL ASPECTS

5.1 The Constitution of India mentions two categories of ports, viz., major and intermediate and minor ports. Major ports are in the Union List and the administrative set up is governed by the Acts of Parliament. Minor and intermediate ports are under the State List. They are governed directly by maritime State Governments within their respective jurisdiction. For major ports, statutory bodies are formed and the revenue expenditure is met from the revenues earned by way of fees and charges for services rendered, etc. In the case of minor and intermediate ports, the administrative set up varies from State to State but mostly they run as one of the departments of the State. Development schemes of the major ports are financed from the funds obtained as loans from Government of India and by public subscription. In the case of minor and intermediate ports, development funds are obtained from the Consolidated Fund of the State.

5.2 The Financial Resources

5.2.1 Ports in Gujarat earn revenues by way of levies under different heads. It was only Rs. 93.88 lakhs in 1961-62 while it was Rs 247 lakhs in 1968-69. It is estimated that by the end of the Fourth Plan, it will be about Rs. 250 lakhs. Although increasing every year, it is not likely to even meet the expenditure on revenue account State ports are running as services department, although they are classified as semi-commercial. The capital expenditure is, therefore, met from the Consolidated Fund of the State. All the Development Plans are financed from this fund, and they form a part of the State Plan.

5.2.2 The Government of India also financed some of the development schemes of previous Plans of the ports by way of loans to the State Governments but the Central Government have now revised their policy and funds are not provided for development schemes of the ports of the State. However, the Government of India provide loans for the development of one or two selected ports where the outlay is considerable. During the Third and Fourth Plans, the Government of India have accepted liability on account of the development of Porbandar as an all weather port to the extent of Rs. 692 lakhs.

5.2.3 During the Fifth and Sixth Plans also, the total cost of development of ports amounting to Rs. 1,000 lakhs and Rs. 1,800 lakhs respectively is included in the overall State Plan schemes. The development of Salaya as a deep water port is included under the Central sector during the Fifth Plan. Similarly, provision has been made for spill over works of Porbandar all weather port. During the Sixth Plan, the development cost of Pipavav as a deep water port has been included in the Sixth Plan outlay under Central sector It is the declared policy of the Government of India, to develop at least one deep water direct berthing port in each Plan. The provision under Central sector is, therefore, proposed keeping in view this policy.

CHAPTER VI

IMPLEMENTATION

6.1 The construction of civil engineering structures and acquisition of lighterage fleet, dredgers and cargo handling equipment are specialised jobs. Due to the varied nature of work, they take long in completion. Deliveries are also delayed. For the proper implementation of the schemes in the Fifth and Sixth Plans, it is necessary to take action at a very early stage.

6.2 Organisation

6.2.1 The State port administration forms a part of the Public Works Department (Roads and Buildings wing) with the Director of Ports as the Head of the Department. For civil engineering works of both design and execution, there is a Superintending Engineer, who is assisted by executive engineers posted at important ports. For the purchase of mechanical equipment and maintenance and repairs of machineries, there are two mechanical divisions under executive engineers. The administration of ports is in charge of port officers. At the two direct berthing ports, port officers are qualified nautical officers with qualified pilots under them. At other ports, the port officers are only administrative officers with experience in traffic and administration.

6.2.2 By the end of the Fifth Plan, ports will have to handle a traffic of 6.00 million tonnes. This will mean a rise of 50 per cent over the revised estimate of traffic by the end of Fourth Plan. The organisation of Port Department will, therefore, have to be strengthened by addition of administrative and technical staff. However, provision for this additional administrative personnel is not made in the Plan, as it is included in the revenue budget of the ports.

6.3 Training and Research

6.3.1 As already mentioned, the planning and execution of harbour works and the purchase and maintenance of specialised equipment and machineries need specially trained staff. In the past, when such training was not available in this country, two officers were sent for training to Europe; one in 1957-58 to Netherlands and another in 1961 to the United Kingdom. Recently, a post-graduate diploma course has been organised at the Indian Institute of Technology at Powai (Bombay) and three officers have already taken training in the Institute. One officer is now under training there. During the Fifth and Sixth Plans also, similar training will be given to the officers of the Department. Specialised training under the various U. N. Agencies will also be availed of, whenever opportunity arises.

6.3.2 Rapid technological advances in other countries have been of great significance in reducing the cost of development as well as the designing of complicated structures. The Department keeps abreast of these developments and also arranges for research study through institutes such as the Central Water and Power Research Laboratory at Khadakvasla near Poona and the Engineering Research Institute at Baroda. Special provision, therefore, is not made for a research organisation exclusively for ports.

6.3.3 The institutes mentioned above only carry out research in engineering fields. There is, however, no research organisation in the field of traffic problems of the ports. The need is felt for creating a research organisation in the field of traffic and planning as a part of the Department. At this stage, however, no provision is proposed in the Plans for this.

6.4 Manpower Requirement

6.4.1 The administration of ports and the execution of the port development schemes require a large number of qualified technical and administrative personnel. The cargo handling equipment are required to be manned by skilled, semi-skilled and un-skilled staff. The estimated requirement of personnel required during the Fifth and Sixth Plans are shown in Appendix F.

CHAPTER VII

EQUIPMENT AND MACHINERY

7.1 The movement of cargo to and from shore and ship is the principal function of the port. The efficiency achieved in this movement will reflect in the efficiency of port as a whole. Mechanical equipment and machinery are replacing out-dated cargo handling methods. The Department, therefore, maintains and operates a large number of mechanised tugs with dumb barges, cranes and fork lift trucks. Dredging equipment for creating and maintaining required depths at the ports is also maintained. With the increased traffic envisaged in the Fifth and Sixth Plans, additional equipment shall have to be acquired during the period. A list of major equipment required during these two Plans is at Appendix G.

7.2 Maintenance and Repairs

7.2.1 Due to constant use, machinery is required to be maintained and repaired regularly at specified intervals. For this purpose, workshops have been provided at all the important ports. There are no workshops at Mahuva and Broach. It is proposed to provide workshop facilities at these ports. It is also proposed to expand and modernise the present facilities at important ports.

7.3 Replacement of Worn Out Units

7.3.1 The Department inherited a good deal of equipment and machinery from the erstwhile princely States. Most of these, particularly dredgers, have mostly outlived their lives. They are, therefore, required to be replaced by new units as repair costs have become exhorbitant. A Committee of Officers of the Department was appointed in 1968 to review the condition of the existing machinery. The Committee recommended the replacement of machinery at an estimated cost of Rs. 129.98 lakhs. A programme of replacement has been drawn up but the progress is slow because of the lack of funds. The Department maintains a Depreciation Reserve Fund and contributions are made every year to this fund from the general revenues. As depreciation is calculated on a straight line method, the amount available is not enough to meet the replacement costs of the units as their costs have gone up by 300 per cent during the course of the three Plans. It is, therefore, not possible to provide adequate funds for this purpose in the revenue account and provision has, therefore, to be made for a part of the funds required for replacement in the Fifth and Sixth Plans. A statement showing the number of units to be replaced during Fifth and Sixth Plans is at Appendix H. Out of the total estimated expenditure of Rs. 383.00 lakhs, an amount of Rs. 125 lakhs is proposed in the Fifth Plan and out of the total expenditure of Rs. 458.00 lakhs during the Sixth Plan, an amount of Rs. 180 lakhs is provided in that Plan. The remaining expenditure will be met from the Depreciation Reserve Fund.

CHAPTER VIII

CONCLUSION AND RECOMMENDATIONS

8.1 Ports, as one of the principal means of transport, play a vital role in the economic development of the country. The traffic projections show that by the end of Fifth and Sixth Five Year Plans traffic of 6 0 million tonnes and 7.5 million tonnes respectively will be handled by the ports in Gujarat. It will, therefore, be necessary to draw up development and modernisation plans of ports to cater to the needs of these expectations. Not only facilities will have to be expanded at existing ports, but new port sites with alongside facilities for deep drafted vessels will also have to be developed

Conclusion

8.2 In view of the recent trend towards giant sized vessels, it is necessary to reconsider the development aspect of ports Ships engaged in the trade need a quick turnround in loading and unloading operations Development activities, therefore, will have to largely concentrate on those ports where alongside facilities for deep draft vessels can be provided. For existing ports where alongside facilities are not provided and cannot be provided due to physical limitations, it will be necessary to deepen the existing channels for continuous turnround of the lighterage fleet. The lighterage fleet, which is a distinct feature of Gujarat ports, will also have to be expanded to ensure a minimum turnround of 2,000 to 2,500 tonnes per day per ship.

8.3 Perspective Plans at a Glance

8.3.1 On the basis of traffic projections, schemes for the development of ports have been drawn up. An outlay of Rs. 1,000 lakhs has been proposed in the Fifth Five Year Plan. These include expansion and modernisation of existing facilities and development of a new port at the mouth of the Narmada. It is also proposed to purchase additional equipment for handling cargo and dredging equipment for capital as well as maintenance dredging. An additional provision of Rs. 650 lakhs is also proposed under the Central sector during the Plan period for spill over works of Porbandar all weather port and additional berthing facility and the development of Salaya as a deep water port during the Plan.

8.3.2 During the Sixth Plan, an outlay of Rs. 1,800 lakhs is proposed for the expansion of facilities at the ports of Bedi, Bhavnagar, Okha, etc. Provision has also been made for a part of the expenditure on the replacement of worn out machinery and cargo handling equipment. Additional dredging equipment is also planned to be purchased. In addition to the Plan provision, a further provision of Rs. 700 lakhs has been proposed under the Central sector for the spill over works of Salaya port and the construction of a deep water port at Pipavav.

8.4 Recommendations

8.4.1 The ports of Gujarat will be required to handle increased traffic during the 1974-84 decade. They should, therefore, be developed so as to make them ready for handling the increased traffic. It is recommended that the proposed outlay during the Fifth and Sixth Five Year Plans should be made. Recommendations may be made to the Government of India to approve the provision proposed during both the Plans under the Central sector. It is also recommended that the future policy should be to develop deep sea ports with alongside berthing facilities.

8.4.2 The development of ports and the expansion of port based industries largely depend upon the availability of means of communications with the hinterland. Railways and roads connecting ports with the up-country play an important role in the development of industries and ports. It is, therefore, recommended that the existing bottlenecks in the railway network of Gujarat ports should be removed by (i) providing railway links up to the port if non-existance, (ii) by converting to broad gauge some of the existing metre gauge lines so as to increase the hinterland of ports. The road network from the ports should also be improved and expanded.

CHAPTER IX

INLAND WATER TRANSPORT

Introduction

9.1.1 India is gifted with several river systems such as the Ganga, Brahmaputra, Indus, Bhagirathi, Hooghly, Mahanadi, Godavari, Krishna, Cauvery, Narmada, Tapti, etc. History provides many examples of the important role played by the rivers in unifying regions. While these rivers had figured prominently as carriers of men and material in ancient India, water transport today thrives only in States such as Bengal, Assam, Andhra Pradesh and Kerala and to a limited extent in certain other States. In order to appreciate the present day problems and to plan for future development, a survey of the historical background of the waterways of our country and some of the progressive countries of America and Europe, where water transport has come to play a vital role, is essential

Historical Background

9.1.2.1 In India, river valleys were the seats of civilisation and waterways were main means of communication. The 19th century can be truly called the era of canals and waterways as they formed the main arteries in the transport system of the country. With the active encouragement given to the railways at the cost of water transport and the greater withdrawal of water for irrigation, the Inland Water Transport System of the country sufferred a great set back with the result that even existing waterways were silted and became unsuitable for the plying of vessels.

9.1.2.2 After independence, the Government of India paid greater attention to the revival of the inland water transport system in the country A committee was appointed by the Government of India for the purpose and the report of the committee was published in June, 1959, bringing out the backwardness of the country in the matter of development of inland water transport as compared to the advanced countries of the world. Another committee was appointed in the year 1969 and its report was published in October, 1970 These efforts show that the inland water transport which was once the most common means of transport in India is now likely to regain its real place in the transport system of the country.

Inland Water Transport in Other Countries

9.1.3 In countries such as the U. S. A., France, Germany, Netherlands, Belgium, U. S. S. R., etc., inland water transport has been existing even before the advent of railways and this transport system is being used extensively. The Netherlands Waterways are so highly developed that the ratio of navigable waterways to the populated areas is the highest in the world. Traffic to the extent of 120 million tonnes is carried over the waterways in that country forming about 20 per cent of the total volume of traffic carried by all means by transport.

Gujarat's Position in India

9.1.4 In Gujarat, rivers Narmada, Tapti, Mahi, Mindhola, Ambica and Purna offered scope of some navigation near their confluence with the sea and considerable distance upstream. However, there are no canals where navigation is possible. Even these rivers, where navigagation is possible, are silting up rendering them unsuitable for navigation by small craft. With the construction of multipurpose river valley projects, there are bright chances of improving facilities for inland navigation in many of the rivers of Gujarat.

Pattern of Development

9.2.1.1 During the First and Second Plan periods, the development of inland water transport was neither considered nor executed.

9.2.1.2 As per the recommendations of Gokhle Committee, development schemes for inland water transport in rivers Narmada and Tapti were taken up for execution during the Third Five Year Plan.

9.2.1.3 The ports of Broach and Surat situated on the banks of Narmada and Tapti, respectively have been famous during the sailing vessels era. In order to link these ports with other areas on the banks of the rivers, landing jetties were constructed for the movement of cargo to and from these ports, at an estimated cost of Rs. 8.0 lakhs. This also included acquisition of four dumb barges for the movement of cargo.

Fourth Plan Targets

9.2.2 River Narmada is navigable for a distance of 150 kms. from its mouth. The water depths vary from 10 to 5 feet during winter months in this reach, but vessels up to 100 tonnes capacity can be navigated up to Broach during high tides. Similarly, river Tapti is navigable up to 50 kms. from its mouth. There is an urgent need of providing navigable channels from the mouth of these rivers to reasonable distances upstream in order to provide uninterrupted flow of traffic but, so far, no schemes have been approved for inclusion in the Fourth Five Year Plan. The Bhagwati Committee on Inland Water Transport has recommended certain schemes for the development of inland water transport in these rivers as well as in other selected rivers where it is physically possible to develop the inland water transport system. The schemes are shown in Appendix I. Their approval is awaited from the Government of India. A very short period is available for the implementation of the schemes recommended for development of inland water transport in Gujarat State. Even if approval is received in the near future, very little expenditure can be incurred during the Fourth Plan period.

Perspective Plan

9.3.1 In Gujarat, the growth of industries and agricultural products is appreciable. Gujarat is also rich in mineral wealth. However, there are certain regions which are under-developed and have no proper and adequate means of communications. The region in South Gujarat located on the banks of the Narmada and Tapti are rich in mineral wealth and agricultural and forest products. It is necessary to see that the utmost utilisation is made of the inland water transport in these rivers which are navigable for quite long distances for opening up inaccessible places to industrial and agricultural development. The State Government has accordingly considered to undertake development schemes for inland water transport in the next two Five Year Plans, *i. e.*, in the Fifth and Sixth Plans, on the basis of the recommendations of the Bhagwati Committee. These also include the establishment of sea communications between places and ports on the opposite sides of the Gulf of Cambay.

Basic Objectives

9.3.2. The basic objectives to be achieved as regards inland water transport development are to remove the bottlenecks of bars and shoals in the river beds and construct landing facilities for cargo and passengers at selected places on the river banks and the Gulf of Cambay.

Perspective for Fifth Plan and Sixth Plan

9.3.3. In the Fifth Five Year Plan, it is proposed to complete the spill over schemes of the Fourth Plan and undertake new schemes with a total outlay of Rs. 100 lakhs. It is hoped dredging equipment required for removal of sand bars and creating navigable channels would be acquired during the Plan period. The scheme of providing landing facilities at various

Pattern of Development

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Perspective for Fifth Plan and S

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places will also be undertaken. An outlay of Rs. 75 lakhs is proposed for the Sixth Plan. The schemes proposed to be undertaken are for providing facilities for movement of cargo and passengers from one place to another on the river banks, as also for spill over schemes of the Fifth Plan. Schemewise outlays are shown in Appendix J.

Financial Aspects

9.4.1 The waterways in India where mechanically propelled vessels ply are in the Concurrent List of the Constitution of India. The development schemes of inland waterways are, therefore, the joint responsibility of the State Government and the Central Government, but in view of continued neglect of the past several decades, the Government of India have accepted, as a policy, to finance all the development schemes of inland water transport by way of loans to State Government.

Resources

9.4.2. The State Government have limited means for undertaking inland water transport development schemes. The expenditure towards the development of inland water transport in Gujarat during the Third Five Year Plan was from loan assistance under the Central sector. Similarly, expenditure in respect of the Fourth Five Year Plan schemes will also be provided by the Government of India During the Fifth and the Sixth Plans also, all the schemes are shown under Central sector.

Financing Pattern for Development Schemes

9.4.3. As is done in the previous Plans, it would be necessary to continue the same pattern of financing the inland water transport development schemes proposed to be undertaken in the Fifth Plan and Sixth Plans, *viz.*, under Central sector.

Implementation

Organisation

9.5.1.1 The inland water transport system in Gujarat is still to be brought under one organisation. At present, there are different organisational agencies, mostly operated by private parties by way of running ferry services between one place to another across the rivers and the District Collectors/Panchayats are looking after the issue of registrations, etc.

9.5.1.2 In an earlier report of the Inland Water Transport Committee headed by Shri Gokhle, it is recommended that the State Government should set up its own techinical organisation to study details and prepare schemes with project reports for development of new waterways and maintenance of existing ones under the guidance of the Central Organisation. At present, there is no such organisation in Gujarat State. The Ports Department has recently been entrusted with the task of providing a few basic aminities. But, the present arrangement is not effective. It is proposed to provide a separate organisation consisting of qualified officers, having experience in river and harbour engineering works, to look after the entire development scheme of inland water transport.

Training and Research

9.5.2. It would be necessary to impart training to certain personnel in [illegible] connected with the maintenance and operation of inland water transport. It [illegible] necessary to create a research cell for investigation and suggesting means to [illegible] efficiency.

Manpower

9.5.3 For the working of the inland water transport system, the staff requirement can broadly be classified as :—

(i) Administrative

(ii) Navigation

(iii) Engineering (Civil, Mechanical and Hydrographic)

(iv) Skilled and unskilled labour.

The requirement of manpower will be as per Appendix K.

Equipment and Machinery

9.6.1.1 It is proposed to provide shallow draft mechanically propelled vessels for movement of cargo and passengers in the inland waters. The existing vessels running on sails are not only outmoded but uneconomical and inefficent. Necessary provision is, therefore, proposed for these crafts. For deepening the channels in river beds, a suitable dredger is also proposed to be purchased.

9.6.1.2 It would also be necessary to provide workshop facilities for repairs and maintenance of available craft units such as dredgers, hopper barges, tugs, launches and cargo barges. For this purpose a small provision is proposed to be made in the Fifth and the Sixth Plans.

Conclusions and Recommendations

9.7.1 The cheapest means of transport, *viz.*, inland water transport, which was once occupying a place of prominence in the Indian Transport System, has been neglected in the past decades. In order to utilise this natural gift, it is necessary to pay more attention to the development of this sector. This will help in the development of backward areas of the State on the banks of important rivers such as the Narmada and the Tapti. It is, therefore, impertive to undertake development works of the inland water transport system.

Perspective Plans at a Glance

9.7.2 The development Plans drawn up for inland water transport provide for outlay of Rs. 100 lakhs during the Fifth Plan and Rs. 75 lakhs in the Sixth Plan. The schemes recommended by the Bhagwati Committee are proposed to be taken up for execution. These schemes were originally to be undertaken and completed during the Fourth Plan period but so far the Government of India's approval to the recommendtions of Bhagwati Committee Report has not been received. The schemes, therefore, are likely to spill over into the Fifth and the Sixth Plans. Additional schemes are also proposed.

Recommendations

9.7.3 The inland water transport is one of the important sectors of the transport system of the country. It is, therefore, recommended that the development schemes proposed in the Fifth and Sixth Plans be taken up so that our rivers and waterways can be used for development of backward areas in their upper reaches. It is also recommended that these schemes be included in the Central sector.

APPENDIX A

ACTUAL EXPENDITURE IN THE SECOND AND THIRD PLANS, THREE ANNUAL PLANS AND FOURTH PLAN

(Rs. in lakhs)

Sr. No.	Name of the Ports	Actual expenditure (Rounded off)				Three Annual Plans		Fourth Plan		Actual expenditure first two years of the Fourth Plan 1969-70 and 1970-71	
		Second Plan		Third Plan							
		State Sector	Central Sector	State Sector	Central Sector	State Sector	Central Sector	State Sector	Central Sector	State Sector	Central Sector
1	2	3	4	5	6	7	8	9	10	11	12
A	Development of Intermediate and Minor Ports										
	1. Navlakhi	8.30	1.45	2.28	0.74	0.30	5.30	23.60	.	..	..
	2. Bedi	42.36	7.90	13.17	23.78	11.67	7.89	83.03	..	65.52	..
	3. Salaya	..	1.10	..		.	..	28.00	.	..	..
	4. Okha	30.64	11.91	50.68	47.28	20.73	31.04	37.00	.	0.65	15.04
	5. Porbandar	55.81	12.95	55.90	25.24	4.24	55.95	18.50	692.00	3.05	40.99
	6. Veraval	50.14	00.45	42.70	17.88	7.78	10.15	16.70	..	4.9	..
	7. Pipavav	..	.			..	..	15.00	..	.	..
	8. Mahuva	1.44		12.15		15.03	1.41	9.40		11.26	..
	9. Bhavnagar	106.28		89.52	4.31	103.12	5.02	64.30	.	37.50	..
	10. Narmada			.		.	.	25.00	.		..
	11. Other Intermediate and minor ports	46.33		32.65	49.55	19.40	0.21	21.00	.	..	0.22
B	Construction of Office buildings and Staff quarters.	.			.			14.00		.	..
C	Dredgers and dredging	.	.	*				150.00	.	67.10	..
	Survey of Gujarat Coast	..					.	5.00	..	0.62	..
	Total	347.35	35.76	297.05	171.78	182.43	135.60	500.00	692.00	233.50	96.26

NOTE.—*An expenditure of Rs. 135.52 lakhs was incurred in the First Five Year Plan.

APPENDIX B

SCHEMES OF THE FOURTH FIVE YEAR PLAN
STATE SECTOR

Development of Intermediate and Minor Ports

		Rs. in lakhs
1.	Mandvi Group of Ports (Improvement in port facilities and providing dumb barges)	10.50
2.	Navlakhi (Improvement in dockyard roads, lighter wharf and lighterage fleet)	23.50
3.	Bedi (Extension of landing facilities down stream-cargo handling transit and storage godown)	18.00
4.	Sikka/Salaya (Flotilla-barges and tugs for lighterage working)	28.00
5.	Okha (Flotilla-tug, navigational aids, rolling stock, improvement in dockyard road and railways)	37.00
6	Porbandar (Flotilla-tug and a launch, shore protection works)	18.50
7.	Veraval (Flotilla-barges, open and covered storage and transit facilities) ..	16.30
8.	Bhavnagar (Flotilla-barges, repairs facility at C. Jetty, ancillary port facilities at north quay)	44.30
9.	Mahuva Group of Ports (Flotilla-barges, improvement in port channel, providing groynes, storage facility)	9.40
10.	Dahej (Development works)	10.00
11.	Magdalla (Surat) (Flotilla-barges-repair facility)	8.30
12.	Providing and improving facilities at various minor ports	5.00
13.	Investigation and consultation: minor ports..	5.00
14.	A deep water port at the mouth of the river Narmada	15.00
15.	Workshop equipment, fire fighting equipment and port staff transport facilities	9.20
16.	Self—propelled barges (13 Numbers)	65.00
17.	Renovation and modernisation of port craft and structures to cope with increased demand of traffic without incurring heavy expenditure on new items	10.00
18.	Providing and improving buoys, beacons and navigation facilities at various ports	5.00
19.	Providing and improving water supply and electric facilities at various ports ..	5.00
20.	Plan provision for traffic not assessed or/and for emergency and unforeseen port needs	5.00
21.	Spill over schemes of Third Plan..	20.00
22.	Deep water port at Pipavav	15.00
	Less:—Resources to be made from dues and recoveries as against Self-propelled barges 13 Numbers	52.00
	Total ..	331.00

APPENDIX B—*concld.*

	Rs. in lakhs
2. *Construction of port office building and staff quarters at Navlakhi, Bedi, Okha, Porbandar, Bhavnagar and Broach ports*	14.00
3. *Dredger and dredging*	150.00
4. *Survey of Gujarat coast*	5.00
Grand Total .	500.00

CENTRAL SECTOR

Development of Porbandar Port as an all weather port	692.00

APPENDIX C

THE TONNAGE OF IMPORT AND EXPORT TRAFFIC HANDLED AT THE PORTS OF GUJARAT STATE FROM 1954-55 TO [illegible]

Sr. No.	Year			Imports	Exports	Total
1	2			3	4	5
1	1954-55	..	..	[illegible]	[illegible]	[illegible]
2	1955-56	..	..	[illegible]	[illegible]	[illegible]
3	1956-57	..	..	[illegible]	[illegible]	[illegible]
4	1957-58	..	..	7,28,291	[illegible]	[illegible]
5	1958-59	..	..	[illegible]	[illegible]	[illegible]
6	1959-60	..	..	6,16,267	[illegible]	[illegible]
7	1960-61	..	..	7,62,974	[illegible]	[illegible]
8	1961-62	..	..	[illegible]	[illegible]	[illegible]
9	1962-63	..	..	12,08,566	18,21,167	[illegible]
10	1963-64	..	..	11,91,048	[illegible]	[illegible]
11	1964-65	..	..	14,01,577	[illegible]	[illegible]
12	1965-66	..	..	16,02,249	[illegible]	[illegible]
13	1966-67	..	..	17,40,?01	[illegible]	[illegible]
14	1967-68	..	..	17,07,628	19,23,729	[illegible]
15	1968-69	..	..	13,82,215	[illegible]	[illegible]
16	1969-70	..	..	12,21,966	[illegible]	[illegible]
17	1970-71	..	..	7,64,713	19,61,449	[illegible]

APPENDIX D

DETAILS OF COMMODITYWISE TRAFFIC AT THE END OF FIFTH AND SIXTH PLANS

(Figures in lakh tonnes)

Sr. No.	Name of Commodity	Estimated Traffic at the End of the Fifth Plan	Estimated Traffic at the End of the Sixth Plan
1	2	3	4
	Imports		
1	Mineral Oils	8.00	8.00
2	Rock Phosphate & Sulphur	1.00	0 00
3	Coal and Coke	1.00	0.00
4	Miscellaneous	4.00	4.00
	Total	14.00	12.00
	Exports		
1	Bauxite and Limestone	2.00	0.00
2	Cement & Clinker	6.00	6 00
3	Salt	6 00	6.00
4	Oil Cakes & Oil Seeds	7.00	7 00
5	Miscellaneous	4 00	5 00
	Total	25 00	24 00
	Additional Traffic Expected		
1	Fertilizer Project near Mithapur-Okha	2.00	7.00
2	Pig Iron Plant, Bhavnagar	2.00	5.00
3	Crude Oil for Refinery	14 00	15 00
4	Cement Plant at Porbandar	3 00	4 00
5	Narmada Port (South Coast of Gujarat) Development	..	8.00
	Total ..	21 00	39.00
	Grand Total ..	60.00	75 00

APPENDIX-E

FINANCIAL OUTLAYS OF PROPOSED SCHEMES PORTWISE IN ORDER OF PRIORITY DURING THE FIFTH PLAN

(Rs. in lakhs)

Sr. No.	Name of the port and brief description of schemes	Proposed outlay during Fifth Plan
1	2	3
	STATE SECTOR SCHEMES	
	Spill over schemes of previous Plan	25.00
	A—Development of Intermediate and Minor Ports	
1	Okha (Dredging of approach channel and turning basin, oil mooring berth and expansion of repair facilities)	30.00
2	Bhavnagar (Dredging, night navigation facilities, roads and additional flotilla units)	70.00
3	Bedi (Expansion of downstream facilities, additional flotilla, dreging and expansion of repair facilities)	100.00
4	Veraval (Dredging, extension of cargo handling facilities and additional flotilla) ..	50.00
5	Porbandar (Cargo handling equipment)	50.00
6	Other minor ports	50.00
7	Replacement of equipment (Part expenditure on replacement of worn out cargo handling equipment)	125.00
8	Navlakhi (Extension of landing facilities, additional flotilla and staff quarters) ..	25.00
9	Mahuva (Additional flotilla units, dredging, etc.)	10.00
10	Narmada Port (Preliminary works and development of deep sea port) ..	30.00
11	Pipavav (Investigation and preliminary works of development as deep sea port)	10.00
	B—Construction of Office Buildings and Staff Quarters at Various Ports	
	(Providing office buildings and amenities to staff at various ports)	25.00
	C—Dredgers and Dredging	
	(Purchasing 3 dredging units and capital dredging)	325.00
	D—Survey of Gujarat Coast	
	Hydrographic survey and other investigation of various ports of Gujarat ..	25.00
	Total ..	1,000.00

APPENDIX E—*contd.*

DURING THE SIXTH PLAN

(Rs. in lakhs)

Sr No	Name of the port and brief description of schemes	Proposed outlay during Sixth Plan
1	2	3
	STATE SECTOR SCHEMES	
	Spill over schemes of previous Plan.	
	A—Development of Intermediate and Minor Ports.	
1	Narmada port (Preliminary works and development of deep sea port)	20.00
2	Okha (Dredging of approach channel and turning basin, oil mooring berth and expansion of repair facilities)	500.00
3	Bhavnagar (Dredging, night navigational facilities, staff quarters and additional flotilla units)	150.00
4	Bedi (Expansion of downstream facilities, additional flotilla, dredging and expansion of repair facilities)	150 00
5	Veraval (Dredging, extension of cargo handling facilities and additional flotilla)	200.00
6	Porbandar (Cargo handling equipment)	100.00
7	Other minor ports	50.00
8	Replacement of equipment (Part expenditure on replacement of worn out cargo handling equipment) ..	50.00
9	Navlakhi (Extension of handling facilities, additional flotilla and staff quarters)	180.00
10	Salaya (Purchase of cargo handling equipment)	[illegible]
11	Mahuva (Additional flotilla units, dredging, etc.) ..	[illegible]
	B—Construction of Office Buildings and Staff Quarters at [illegible]	
	Providing office buildings and amenities to staff at [illegible]	[illegible]
	C—Dredger and Dredging	
	Purchasing three dredging units and [illegible]	[illegible]
	[illegible]—Survey of Gujarat coast	
	Hydrographic survey and [illegible]	[illegible]

APPENDIX E—*concld.*

(Rs. in lakhs)

Sr. No	Name of the port and brief description of schemes	Proposed outay during Fifth Plan	Proposed outlay during Sixth Plan
1	2	3	4
	CENTRAL SECTOR SCHEMES		
1.	Porbandar all weather port (spillover scheme) (Spillover scheme of all weather port)	200.00	..
2	Porbandar all weather port-new schemes (Additional berthing facilities)	50.00	..
3.	Salaya (Development works of deep sea port)	400.00	100.00
4.	Pipavav (Development works of deep sea port)	..	600.00
	Total ..	650.00	700.00

SUMMARY

State Sector Schemes	1,000.00	1,800.00
Central Sector Schemes	650.00	700.00
Grand Total ..	1,650.00	2,500.00

APPENDIX F

PROPOSED REQUIREMENT OF TRAINED PERSONNEL DURING THE FIFTH AND SIXTH PLANS

Sr No.	Category	Yearwise requirement during Fifth Plan					Total 1974-79	Additional requirement during Sixth Plan	Total No. of trained personnel at the end of Sixth Plan
		1974-75	1975-76	1976-77	1977-78	1978-79			
1	Administrative	2		1	1	1	5	10	15
2	Navigational			10			10	20	30
3	Engineers (Civil and Mechanical)	10	15	20	20	25	90	180	270
4	Skilled labour	100	125	150	175	200	750	1 500	2250
5	Unskilled labour	200	250	300	350	400	1 500	3 000	4 500

APPENDIX G

CARGO HANDLING, DREDGING, OTHER EQUIPMENT AND MACHINERIES PROPOSED TO BE ACQUIRED DURING THE FIFTH AND SIXTH PLANS

Sr. No.	Description of units to be acquired	Estimated quantity to be acquired in Fifth and Sixth Plans	To be acquired in Fifth Plan		To be acquired in Sixth Plan	
			Nos.	Estimted amount (Rs. in lakhs)	Nos.	Estimated amount (Rs. in lakhs)
1	Self propelled barges, 250 tonne capacity.	12 Nos.	6	75.00	6	75.00
2	M. S. Dumb barges, 100 tonne capacity	40 Nos.	20	26.00	20	26.00
3	350 BHP Tugs	4 Nos.	2	32.00	2	32.00
4	Grab Pontoon Dredger, non-propelled type	1 No.	1	40.00	..	Nil.
5	Dipper Dredger	1 No.	..	..	1	100.00
6	Cutter Suction Dredger ..	1 No.	..	..	1	150.00
7	Steel Dumb hopper barges, 200 tonne capacity.	8 Nos.	4	28.00	4	28.00
8	Workshop equipment ..	..		11.00		11.00
			Total ..	212.00		422.00

APPENDIX II

PROPOSED REPLACEMENT OF EQUIPMENT / FLOTILLA CRAFT AGAINST THE VARIOUS UNITS COMPLETING NORMAL LIFE OF UTILITY DURING THE FIFTH AND SIXTH FIVE YEAR PLANS

Sr. No.	Flotilla crafts to be replaced	Total No. of Units	Replacement during Fifth Plan		Replacement during Sixth Plan	
			Nos.	Estimated amount (Rs. in lakhs)	Nos.	Estimated amount (Rs. in lakhs)
1	Barges					
	100 tonne capacity . ..	177	88	118 00	89	125 00
2	Tugs					
	(a) 350 BHP .	13	7	112 00	6	108 00
	(b) 150 BHP ..	8	4	40 00	4	44.00
3	Launches 88 BHP ..	6	3	15.00	3	18.00
4	Dredgers					
	Grab Dredger 2					
	Dipper Dredger 1 ..	3	1	40.00	2	90 00
5	Hopper barges					
	(a) 400 tonne capacity	6	4	48.00	2	26.00
	(b) 200 tonne capacity	4	..	—	4	38.00
	(c) 100 tonne capacity .	4	2	10.00	2	11 00
			Total ..	383 00		458 00

APPENDIX I

(Para 9.2.2)

SCHEMES PROPOSED FOR THE DEVELOPMENT OF INLAND WATER TRANSPORT IN THE FOURTH FIVE YEAR PLAN

Sr. No.	Name of the Scheme	Provision (Rs. in lakhs)
1	2	3
1.	Landing facilities at various places on rivers Narmada, Tapti and Purna.	9.50
2.	Purchase of dredging equipment	80.00
3.	Hydrographic survey	2.50
4.	Development of ferry service between Dahej and Gogha ..	38.00
	Total ..	130.00

APPENDIX J

(Para 9.3.3)

FINANCIAL OUTLAY FOR INLAND WATER TRANSPORT SCHEMES DURING THE FIFTH AND THE SIXTH PLANS

(Rs. in lakhs)

Sr. No.	Name of Schemes	Outlay during	
		Fifth Plan	Sixth Plan
1	2	3	4
1	Landing facilities at various places on rivers Narmada, Tapti and Purna-Spill over schemes.	6.00	.
2	Purchase of dredging equipment—Spill over scheme ..	60.00	5.00
3	Hydrographic Survey—Spill over scheme ..	2 00	..
4	Development of ferry service between Dahej and Gogha—Spill over scheme	12.00	2.00
5	Purchase of floulla craft	15.00	63.00
6	Inland Water Transport Cell	5.00	5 00
	Total ..	100.00	75 00

APPENDIX K

(Para 9.5.3)

PROPOSED REQUIREMENTS OF TRAINED PERSONNEL FOR INLAND WATER TRANSPORT SCHEMES DURING THE FIFTH AND THE SIXTH PLANS

Sr. No.	Category	Yearwise requirement during Fifth Plan					Total 1974-79	Additional requirement during Sixth Plan	Total No. of trained personnel at the end of the Sixth Plan
		1974-75	1975-76	1976-77	1977-78	1978-79			
1	Administrative ..	2	..	..	..	..	2	1	3
2	Navigational ..	..	..	..	5	..	5	20	25
3	Engineers (Civil and Mechanical)	5	..	..	5	5	15	10	25
4	Skilled Labour ..	150	50	50	75	75	400	325	725
5	Unskilled Labour ..	100	150	150	200	225	825	1,200	2,025

Report of the Working Group on Transport and Communications

Part - IV

Tourism and Development of Places of Archaeological Importance

CHAPTER I

INTRODUCTION

1.1 Nature and Scope of Development Activities in the Tourism Sector

Gujarat has a number of places which, if properly developed, can attract tourists from other States in India as well as from abroad. Places associated with national leaders such as Mahatma Gandhi would attract students of modern history. Lothal would interest students of archaeology and ancient history. Places such as Palitana, Modhera and Shamalaji may be visited both by religious pilgrims as well as by those interested in art, history and archaeology. The only surviving habitat of the Asiatic Lion at Sasan Gir is a rare attraction and so is the bird sanctuary at Nal Sarovar. A number of places such as Dwarka, Somnath, Ambaji, Mira Datar, Udwada and Gadhada could be further developed for pilgrims as well as for tourists In addition to all these, there are the dam sites and the reservoirs, the long sea-coast, the forests of the Dangs and other places which can serve as hill stations, holiday homes, picnic spots or health resorts. There is a good deal of scope for the development of all these and other places some of which can be of international importance with enough potential to earn foreign exchange.

1.2 The Beginning

1.2.1 A beginning to promote tourism in Gujarat was made during the Second Five Year Plan period (1956-61) under the *erstwhile State of Bombay. Preliminary* surveys of certain places of tourist interest in Gujarat along with other regions in Bombay were then taken on hand. Prominent among these were Lothal and Sasan-Gir. Conducted air tours emanating from Bombay to see lions in the Gir Forest were undertaken. A proposal to construct Canteen-*cum*-retiring rooms at Lothal was also considered. These plans to promote tourism did not form a part of a separate administrative unit entirely devoted to tourism. There was no separate financial allocation for these items in the Second Five Year Plan. Whatever was needed for construction or maintenance was undertaken by the Public Works Department as part of its many activities and the expenditure incurred on works was from that Department's funds. A Tourist Bureau was opened by the Ahmedabad Municipal Corporation with the assistance of Government.

1.2.2 When Gujarat was formed as a separate State from the 1st May 1960, greater attention began to be devoted to tourism. On the all India level, annual meetings of the Tourist Development Council underlined the need for creating separate units for the development of tourism in the States. These meetings also called upon the Central Government to come forward to assist the States in developing their tourist spots and putting activities connected with tourism on a more scientific basis. As a result of these deliberations, more serious attention was paid by the Centre and the State Governments to develop tourism. Although the State of Gujarat had then been recently formed and its financial resources were small, Government [illegible] [illegible] were included in the *Third Five Year Plan.*

1.2.3 Schemes to promote tourism are divided into three parts. Schemes [illegible] Part I are entirely financed by the Government of India. Generally, these [illegible] [illegible] importance purely for home tourists.

Schemes Included in Third Five Year Plan

1.2.4 As most of the tourist schemes included in Third Plan were undertaken after the formation of the State, data had to be collected before starting work. The first two years of the Third Plan were devoted to this purpose.

The following provisions were made on schemes included in the Third Five Year Plan:—

PART I SCHEMES

(Rs. in lakhs)

	Provision	Expenditure
(1) Provision of transport facilities for tourists visiting Keshod and Sasan-Gir Lion Sanctuary	0.62	0.62
(2) Improvement of Sasan forest bungalow	0.58	0.58
(3) Water supply at Lothal	0.68	0.68
	1.88	1.88

PART II SCHEMES

(Rs. in lakhs)

	Provision			Expenditure		
	Government of India share	State share	Total	Government of India share	State share	Total
(1) Canteen-cum-retiring rooms at Lothal.	1.00	1.00	2.00	1.09	1.09	2.18
(2) Canteen-cum-retiring room at Porbandar.	0.63	0.63	1.26	0.33	0.33	0.66
(3) Holiday home at Chorwad near Gir forest.	0.50	0.50	1.00	0.50	0.50	1.00
(4) Cafeteria at Nal Sarovar Bird Sanctuary.	0.25	0.25	0.50	0.25	0.25	0.50
	2.38	2.38	4.76	2.17	2.17	4.34

PART III SCHEMES

(Rs. in lakhs)

	State Share	Expenditure
(1) Improvement of Dharmashalas	0.50	..
(2) Provision for special facilities for home tourists	2.12	2.00
(3) Development of holiday homes and hill stations	25.00	5.85
	27.62	7.85

Provision of State Share in Third Five Year Plan

(Rs. in lakhs)

Part II Schemes	2.38
Part III Schemes	27.62
Total ..	30.00

Actual Expenditure incurred :

(Rs. in lakhs)

	Government of India Share	State Share	Total
Part I Schemes	1.88	..	1.88
Part II Schemes	2.17	2.17	4.34
Part III Schemes	..	7.85	7.85
	4.05	10.02	14.07

1.3 Tourism Schemes in the Annual Plans

Provisions and expenditure on schemes during Annual Plans 1966-67, 1967-68, and 1968-69 were as under :—

(Rs in lakhs)

Sr No.	Scheme	1966-67		1967-68		1968-69	
		Total provision	Total expenditure	Total provision	Total expenditure	Total provision	Total expenditure
1	Sasan, Porbandar, Veraval complex.		0.16	2.00	0.05	2.13	0.93
2	Tourist facility - Canteen-cum retiring rooms at Lothal and Porbandar and holiday home at Chorwad	0.22	..	0.24		0.16	*2.00
3	Reception Centre at Palitana	0.43		0.38		0.33	
4	Integrated development of Ahmedabad	0.55	0.96	0.87	0.44	1.40	*
5	Development of Modhera Sun Temple	0.22		0.87		0.44	*
6	Development of Nal Sarovar	0.21		0.06		0.22	*
7	Development of Dwarka						.
8	Development of picnic spots	0.43		0.30	0.02	0.43	0.30
9	Development of places associated with Mahatma Gandhi, Sardar Patel and Swami Dayanand Saraswati	0.27					.
10	Tourist bungalows management			0.10	.	0.20	.
11	Holiday homes and hill stations	0.86	0.26	0.80	0.54	1.18	0.40
12	Improvement of dharamshalas	0.15	..	.	..		..
13	Facilities for home tourists	0.30	0.43	0.40	1.00	0.40	0.40
14	Beautification of monuments	..	.	..	..	..	..
15	Motel facilities	..	..	..	..	..	..
16	Foreign publicity	..	..	0.11	..	..	..
	Total ..	3.64	1.81	6.13	2.05	6.93	4.03

* Expenditure shown under scheme at Sr. No. 2 is inclusive of expenditure for the schemes at Sr. Nos. 4, 5 and 6.

1.4 Schemes in the Fourth Plan

1.4.1 Outlays for the tourism schemes in Fourth Five Year Plan are as under :—

(Rs. in lakhs)

Scheme	Fourth Plan outlay 1969-74	Remarks
(1) Development of Sasan, Veraval and Porbandar complex.	1.50*	*This is being enhanced within the overall ceiling of Rs. 50.00 lakhs.
(2) Development of Ahmedabad complex	1.50*	
(3) Sound and Light project at Sabarmati Ashram, Ahmedabad.	6.16	
(4) Development of holiday homes	16.00	
(5) Development of Palitana	3.00	
(6) Transport facilities	2.00	
(7) Special facilities for home tourists	4.00	
(8) Development of picnic spots	3.00	
(9) Development of tourists bureau	2.00	
(10) Management of tourists places	2.00	
(11) Development of places associated with national leaders	1.50	
(12) Hotel and Motel facilities	1.00	
(13) Beautification of the surroundings of archaeological monuments	1.34	
(14) Opening of tourist offices at Jaipur, Udaipur and Calcutta.	1.00	
(15) Improvement of Dharmashalas	1.00	
(16) Foreign publicity	3.00	
Total ..	50.00	

1.4.2 Provision and Expenditure During 1969-70, 1970-71 and 1971-72

(Rs. in lakhs)

Sr. No.	Scheme	1969-70 Provision	1969-70 Expenditure	1970-71 Provision	1970-71 Expenditure	1971-72 Provision	1971-72 Anticipated Expenditure
1	Development of Sasan-Veraval-Porbandar complex.	0.81	0.54	2.34	1.41	1.89	1.89
2	Development of Ahmedabad complex.	1.07	2.48	2.31	2.03	1.29	1.29
3	Sound and Light project at Sabarmati Ashram, Ahmedabad.	1.08	0.09	1.91	2.36	4.25	4.25
4	Development of holiday homes	1.76	3.31	4.44	4.53	3.54	3.54
5	Development of Palitana ..	0.11	..	..	..	..	..
6	Transport facilities ..	..	..	..	..	0.50	0.50
7	Special facilities for home tourists.	0.50	0.57	0.40	0.38	0.40	0.40
8	Development of picnic spots ..	1.36	0.26	1.00	0.66	0.83	0.83
9	Development of tourist bureau	..	..	0.13	0.05	..	..
10	Management of tourist places	0.41	0.34	0.50	0.50	0.30	0.30
	Total ..	7.10	7.59	13.03	11.92	13.00	13.00

1.4.3 By the end of Fourth Five Year Plan, the entire allocation of Rs. 50 lakhs will be spent. Completion of tourist bungalows at Ahmedabad, Veraval, Sasan; holiday home at Hajira; dormitory at Dwarka, Tulsishyam; picnic spots like Balaram, Lasundra, Unai hot springs; tourist counters at Ahmedabad Railway Station and at Airport; Sound and Light project at Sabarmati Ashram; development of Saputara hill station; survey of new places; development of dam sites like Navagam, Ukai, Shamalaji, etc., will be completed.

CHAPTER II

OBJECTIVES AND TOURISM SCHEMES

2.1 Objectives : Fifth and Sixth Plans

2.1.1 The objective in developing tourist places in Gujarat is to create opportunities for tourists to come to historical, archaeological, recreational spots to provide them with amenities of a certain standard and to make their stay both cheerful and comfortable so that they carry a good impression about the places visited. Another objective is to help the Government of India to implement in Gujarat their schemes aimed at attracting foreign tourists. Tourism is a major growth industry. The Group recognises this as well as the fact that tourists are becoming more mobile, more demanding and more sophisticated.

Integration of Home and Foreign Tourism

2.1.2.1 The Perspective Plan for tourism covers international as well as domestic tourists. There is great scope for Home Tourism in Gujarat not only because it is based on sound and centuries old pilgrim traditions but also because an increasing number of Gujaratis, who have settled all over the world (from Trinidad in the Americas to Fiji in the Far East), come to Gujarat on a regular basis. A well developed infrastructure for all these tourists, whether they are returning Gujaratis or low income pilgrims, will be of value in giving a spurt to Foreign Tourist traffic also. In their need for a basic infrastructure, the two are to be closely integrated.

In the sphere of international tourism, the following aspects are important (*i*) promotional efforts, (*ii*) handling requirements, and (*iii*) development of the infrastructure.

Promotional Efforts

2.1.2.2 During the Plan decade, since Gujarat cannot hope to become a centre of *destinational* foreign tourism, its promotional strategy should concentrate on *side-trip* or transit tourism by those, who have come or plan to come to New Delhi (for Agra, Udaipur, Jaipur, Banaras, Kathmandu, etc.) or Bombay (for Goa, Ajanta, Ellora, etc.). Later in the decade, with its infrastructure sufficiently developed, Gujarat can make a bid for one of the PATA Workshops to be held at one of its prime tourist spots such as the Gir Sanctuary. With this it can bag world-wide publicity. It is, therefore, proposed to take action on the following lines :—

(*a*) A sufficient provision is necessary for publicity, literature and advertising abroad. Great stress should be laid on the distribution of such literature. Apart from the tourist offices abroad under the Director General of Tourism, India, travel agencies and all those who are interested in tourism can play an important role in this.

(*b*) In addition to the distribution of literature of the highest international standards and advertising, personal visits by officers of the State Directorate of Tourism and the proposed Tourist Corporation should be planned to international conventions such as those organised by UFTA, PATA and ASTA. These are of particular importance as they provide ideal opportunities not only to promote tourism in Gujarat but are also of great educative value to the officers of the Directorate and the proposed Corporation, keeping them aware of the progress in the world of international tourism. It is only through such contacts that local offices can become aware of the standards now required by international tourists and tour promoters abroad.

(c) At such conventions, cultural shows should also be organised with the efforts to b
co-ordinated with the Director General of Tourism, other State Governments and trav
agents.

(d) Apart from promotional efforts internationally, particularly casette and slide presentations, efforts should be made in the domestic field within the country by maintaining constant liaison with Indian tour operators, travel agents and others interested in the development of tourism. Additional tourist offices should be opened in the country and operators interested in tourism in Gujarat invited to tour the State. The needed hospitality should be provided to such visitors by the State or the Tourist Corporation. This applies to recognized authorities on tourism and prominent writers, editors of important tourist magazines, etc.

(e) In addition to extending hospitality to those interested in the development of tourism in Gujarat, efforts should be made to get Gujarat included in the tours of international travel agents and tour operators who are invited from time to time by the Director General of Tourism and Air India jointly.

(f) Even for transit tourism, a book or a film with a Gujarati locale such as, say, Somnath or Patan or Champaner could do more for Gujarat than all the other promotional efforts put together. It should be possible to commission two or three such books. One may be a success. The phenomenal success of Han Suyin's book 'Love is a Many Splendour'd Thing' in promoting Hong Kong or 'Serengeti Shall Not Die' for African wild life tourism or the film 'Lawrence of Arabia' for Wadi Rum are examples.

Handling Requirements

2.1.2.3 A tourist counter has been opened at Ahmedabad airport. Similar counters should be opened at almost all the airports in Gujarat also. In order to give a regional touch, imaginative plans for the beautification of airport lounges as well as other tourist places should be prepared. It is also necessary to provide an efficient guide service for attending to tourists. The training of guides in Gujarat should be taken up in consultation with the Director General of Tourism. A sufficient provision for training has been incorporated in the Plan.

Infrastructure

2.1.2.4 Here, both *private and public effort is necessary. The following areas may well be looked after by Government :—

(a) Concessional disposal of land and loans to those interested in running hotels, motels, rest houses, etc. These have been provided for in the Plan. Private operators may be encouraged to run such projects.

(b) As regards transport, apart from Government providing and operating tourist coaches and cars, private tour operators may also be encouraged in this field. Air conditioned coaches specially designed for tourists are required as also special observation vehicles for the Gir Lion and other sanctuaries.

(c) Gujarat is famous for its handicrafts and folk dances. A provision should be made for entertainment programmes, especially for foreign tourists, under the scheme of facilities for the tourists. The scheme to invite foreign tourists to Indian homes has proved successful. This should continue in the Fifth and Sixth Plans.

In developing a sound infrastructure, the co-operation of the public is of great importance. The right attitudes will not be there if the public does not understand why Tourism is important for India as also for Gujarat and why tourists should be welcome. In any case, disastrous

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* For the exact manner in which the English Tourist Board supports private capital expenditure on tourist projects in the Development Areas of England, please see Appendix A.

mistakes such as that recently made at Petra, when the only drinking water in the vicinity was diverted to a tourist lodge, must not be made. With such an example and that of the Simian Highlands of Ethiopia before us, it is good to learn that the *maldhari* problem in the Gir Lion sanctuary is being tackled with care and the utmost sympathy.

2.2 Tourist Corporation

2.2.1 The Plan proposes the setting up of a Tourist Corporation to supplement the efforts of private entrepreneurs. The Corportion would be the main agency to deal with most of the schemes, especially to provide better facilities among clean surroundings to tourists at moderate rates. It should maintain the highest standards, particularly in the matter of cleanliness.

2.2.2 Once the proposed Tourist Corporation comes up much of the outlay provided in the Plan would be through that Corporation to which the Government will contribute through equity and loan capital. The Corporation will no doubt judge the priorities and decide on the expenditure looking at it not only from the promotional point of view but also from that of the return on capital.

2.2.3 The day is not far off when hoteliers will find that the demand is increasingly for simple accommodation which is clean and neat. *Pension* type accommodation or small hotels, with simple furniture and clean bathrooms offering bed and breakfast, are what more and more tourists are clamouring for, side-by-side with luxury hotels. The aesthetics of the exterior or interior of such buildings is of prime importance. With increasing tourist arrivals, the private sector need no longer shy away from the smaller tourist centres. Retired couples, say, from the armed forces, could furnish and let out rooms in small houses in such places. It is things like these which encourage the small man to come forward that will give tourism the broad base so essential for the healthy growth of the tourist industry. At present, this is its greatest lacuna. This can also be attended to by the proposed Tourist Corporation .

2.2.4 If this activity is properly organized, foreign tourists will increasingly come to Gujarat, specially to Ahmedabad and then, their visit could be combined with a shopping tour. The famous *patolas* of Gujarat, Kutch hand embroidery, wood carvings, silver, gold and stone studded jewellery, block-printed material, Gujarati bangles, village dresses, folk art, clay and paper toys—all these have a considerable sales potential. A shop for foreign tourists should be set up. Publicity should also be given to the festivals of Gujarat such as the Kite Festival, the *Janmashtami Mela* at Usmanpur temple, the *Navratri garba* festival and so on.

2.2.5 For the development of places of archaeological importance, it is necessary to provide approach roads, directional and other signs, fencing of the required strength, so that the surroundings of the monuments and the trees, shrubs and gardens around them are secure. Trained English-speaking guides at some of the important monuments visited by foreign tourists will also be required. A fresh survey of all such places in Gujarat is necessary so that this work can be completed during the Fifth Plan before the monuments deteriorate further due to the elements and the attentions of souvenir hunters. The required provision for all this has been made in the Plan. They are included in the total of Rs. 5.00 crores, the outlay on approach roads being included in the Road Development Plan.

2.2.6 Tourists like to carry away mementoes as a memory of their visit. Gujarat has many medieval, historic and religious monuments of great architectural beauty, paintings and sculptures which leave a deep impression on the mind. For those who would like to possess replicas of these masterpieces and examples of handicrafts, special emporia should be set up.

2.3 Schemes Proposed for the Fifth and Sixth Plans

2.3.1 Bearing the above in mind, the proposals in the Plan are divided into two main categories :—

2.3.2 Schemes Included in the Fifth and Sixth Plans

Name of the Schemes	Proposed Outlay (Rs. in lakhs)
Development of Sasan-Veraval-Porbandar complex	27.50
Staff quarters, garages, and other facilities along with Government of India Tourist Rest House.	5.00
Swimming pool	1.00
Lion Sanctuary scheme including the rehabilitation of Maldharis ..	40.00
Treetop hotel, or other suitable facility in the Gir forests ..	5.00
Development of Ahmedabad complex and tourist bungalow . .	30.00
Palitana : Development and Tourist Bungalow	30.00
Dwarka : Tourist Bungalow, canteen, etc. . ..	7.50
Improvement of standard of maintenance of Government Guest houses ..	5.00
Modhera : Staff Quarters, etc., ...	3.00
Tourist offices at Jaipur, Calcutta, etc., ...	5.00
Transport facilities	5.00
Foreign publicity	10.00
Hot Springs	10.00
Shamalaji Development	15.00
Development of Picnic Spots	10.00
Development of Dharmashalas	2.00
Ropeways at Girnar, Pavagadh, etc.	40.00
Launches and boats for coastal conducted tours	15.00
Training of personnel	5.00
Expansion and modernisation of existing Holiday Homes	20.00
Development of new Holiday Homes	20.00
Development of Malsamot in Broach district as Hill Station	20.00
Strengthening of the Tourist Section	6.00
Hotel and Motel projects	10.00
Establishment of Tourist Corporation	110.00
Development of places of archaeological improtance	[illegible]

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2.3.3 Details of the Schemes

2.3.3.1 Sasan-Gir Complex

	(Rs. in lakhs)
Development of Sasan	15.50
Staff quarters at Sasan	5.00
Swimming pool at Sasan	1.00
Resettlement of *Maldharis*, construction of the sanctuary boundary, etc. ..	40.00
Tree-top hotel or other facilities	5.00
Development of Somnath-Veraval	7.00
Development of Porbandar	5.00
Total ..	78.50

Sasan-Gir has become one of leading tourist centres and a number of foreign tourists visit it. Its development as that of other wild life centres will have to be strictly in accordance with the advice of wild life experts and conservationists. Please see Appendix B.

Although a tourist bungalow is proposed to be provided by Government of India at Sasan-Gir, much still requires to be done there to meet the growing requirements :—

(1) All the rooms in the existing forest bungalow are proposed to be renovated and 50 per cent of the rooms air-conditioned. (Rs. 1.50 lakhs)

(2) The roads in the forest and forest tracks require improvement. (Rs. 1.00 lakh)

(3) It is proposed to construct additional observation towers and purchase tourist coaches. (Rs. 0.50 lakh).

(4) Most of the tourists come to Gir by air. There is at present a small rest house at Keshod airport. It is proposed to construct a tourist bungalow at Keshod. (Rs. 3.00 lakhs)

(5) Laying out a garden at Sasan. (Rs. 0.50 lakh)

(6) Books, films, exhibits on wild life. (Rs. 2.00 lakhs)

(7) Construction of a theatre, projection room, a small stage and an auditorium to exhibit films on wild life and provide recreation to tourists at Sasan. (Rs. 2.00 lakhs)

(8) Construction of two dormitories. (Rs. 2.00 lakhs)

(9) Purchase of air-conditioned cars and vehicles. (Rs. 3.00 lakhs)

The estimated cost of all the above items to develop the tourist centre at Sasan is Rs. 15.50 lakhs. These estimates do not include the cost of (a) the road links Mendarda and Malia Hatina with Sasan, (b) the improvement of railway station at Sasan and (c) the airport at Keshod.

(10) *Staff quarters, garages and other facilities along with Government of India Tourist Bungalow.*—(Rs. 5.00 lakhs). Government of India has decided to construct a fully air-conditioned rest house with 24 double bedrooms and canteen with other modern amenities at Sasan Gir at a cost of Rs. 11 lakhs.

The State Government has allotted the land and will bear the cost of the staff quarters, *garages, dormitory for drivers, etc.*

(11) *Swimming Pool.*—(Rs. 1.00 lakh) Near the rest house which is located on the river Hiren a swimming pool is proposed for tourists, complete with changing rooms, a snack bar etc.

(12) *Resettlement of Maldharis from Sasan.*—(Rs. 40 00 lakhs) To develop the Gir Lion sanctuary, it is necessary to resettle the *Maldharis* residng in the Gir Forest at present as well as to construct a boundary wall for the sanctuary. The Forest Department has prepared a scheme for this. Rs. 40 lakhs will be required early in the Plan period to implement this scheme.

(13) *Tree-top hotel.*—(Rs. 5.00 lakhs) A Tree-top hotel similar to those in Nepal and East Africa may attract more foreign tourists. If this is not suitable, some other appropriate facility for watching the lions will be needed such as observation towers along with salt licks.

To develop Sasan as an important spot for attracting foreign tourists, attention to the following is necessary :—

(*i*) Adequate air transport from Bombay, Ahmedabad and Delhi.
(*ii*) Tourist taxis and air-conditioned coaches to and from the airport.
(*iii*) Accommodation with all modern amenities.
(*iv*) Statistical data about the arrival of foreign tourists to plan future development.
(*v*) Shops at the airport as well as the rest house to sell local products and handicrafts such as *bandhanis*, wood-work, lacquer work, mirror work, toys, etc.

(14) *Somnath–Veraval.*—(Rs. 7.00 lakhs)—Apart from the famous Somnath Temple near Veraval, there is an excellent beach. Sasan is only 35 kms from there Foreign as well as home tourists visiting Sasan pass through Somnath Veraval. The Tourist Bungalow at Somnath Veraval is proposed to be improved and sea-side amenities such as beach umbrellas, etc., provided.

(15) *Porbandar.*—(Rs. 5.00 lakhs)—It is proposed to extend facilities for tourists at Porbandar which is becoming increasingly popular on account of its association with Mahatma Gandhi.

A tourist bungalow with modern facilities and the development of the area between *BJ and Bapu's house* as national monuments are proposed.

There is need to install a projector and build up a library of films and records on Gandhiji's life.

The extra facilities at Porbandar will cost about Rs. 5 lakhs.

Total for all schemes connected with Sasan-Gir-Veraval-Porbandar complex is estimated at Rs. 78.50 lakhs as under :—

	(Rs. in lakhs)
Sasan Gir	66.50
Somnath	7.00
Porbandar	5 00
	78.50

Government of India will be requested to share the cost on important sch

2.3.3 Details of the Schemes

2.3.3.1 Sasan-Gir Complex

	(Rs. in lakhs)
Development of Sasan	15.50
Staff quarters at Sasan	5.00
Swimming pool at Sasan	1.00
Resettlement of *Maldharis*, construction of the sanctuary boundary, etc.	40.00
Tree-top hotel or other facilities	5.00
Development of Somnath-Veraval	7.00
Development of Porbandar	5.00
Total	78.50

Sasan-Gir has become one of leading tourist centres and a number of foreign tourists visit it. Its development as that of other wild life centres will have to be strictly in accordance with the advice of wild life experts and conservationists. Please see Appendix B.

Although a tourist bungalow is proposed to be provided by Government of India at Sasan-Gir, much still requires to be done there to meet the growing requirements :—

(1) All the rooms in the existing forest bungalow are proposed to be renovated and 50 per cent of the rooms air-conditioned. (Rs. 1.50 lakhs)

(2) The roads in the forest and forest tracks require improvement. (Rs. 1.00 lakh)

(3) It is proposed to construct additional observation towers and purchase tourist coaches. (Rs. 0.50 lakh).

(4) Most of the tourists come to Gir by air. There is at present a small rest house at Keshod airport. It is proposed to construct a tourist bungalow at Keshod. (Rs. 3.00 lakhs)

(5) Laying out a garden at Sasan. (Rs. 0.50 lakh)

(6) Books, films, exhibits on wild life. (Rs. 2.00 lakhs)

(7) Construction of a theatre, projection room, a small stage and an auditorium to exhibit films on wild life and provide recreation to tourists at Sasan. (Rs. 2.00 lakhs)

(8) Construction of two dormitories. (Rs. 2.00 lakhs)

(9) Purchase of air-conditioned cars and vehicles. (Rs. 3.00 lakhs)

The estimated cost of all the above items to develop the tourist centre at Sasan is Rs. 15.50 lakhs. These estimates do not include the cost of (a) the road links Mendarda and Malia Hatina with Sasan, (b) the improvement of railway station at Sasan and (c) the airport at Keshod.

(10) *Staff quarters, garages and other facilities along with Government of India Tourist Bungalow.*—(Rs. 5.00 lakhs). Government of India has decided to construct a fully air-conditioned rest house with 24 double bedrooms and canteen with other modern amenities at Sasan Gir at a cost of Rs. 11 lakhs.

The State Government has allotted the land and will bear the cost of the staff quarters, garages, dormitory for drivers, etc.

(11) *Swimming Pool*.—(Rs. 1.00 lakh) Near the rest house which is located on the river Hiren a swimming pool is proposed for tourists, complete with changing rooms, a snack bar etc.

(12) *Resettlement of Maldharis from Sasan*.—(Rs. 40.00 lakhs) To develop the Gir Lion sanctuary, it is necessary to resettle the *Maldharis* residng in the Gir Forest at present as well as to construct a boundary wall for the sanctuary. The Forest Department has prepared a scheme for this. Rs. 40 lakhs will be required early in the Plan period to implement this scheme.

(13) *Tree-top hotel*.—(Rs. 5 00 lakhs) A Tree-top hotel similar to those in Nepal and East Africa may attract more foreign tourists. If this is not suitable, some other appropriate facility for watching the lions will be needed such as observation towers along with salt licks.

To develop Sasan as an important spot for attracting foreign tourists, attention to the following is necessary :—

(i) Adequate air transport from Bombay, Ahmedabad and Delhi
(ii) Tourist taxis and air-conditioned coaches to and from the airport.
(iii) Accommodation with all modern amenities.
(iv) Statistical data about the arrival of foreign tourists to plan future development.
(v) Shops at the airport as well as the rest house to sell local products and handicrafts such as *bandhanis*, wood-work, lacquer work, mirror work, toys, etc.

(14) *Somnath–Veraval*—(Rs. 7 00 lakhs)—Apart from the famous Somnath Temple near Veraval, there is an excellent beach. Sasan is only 35 kms. from there Foreign as well as home tourists visiting Sasan pass through Somnath Veraval The Tourist Bungalow at Somnath Veraval is proposed to be improved and sea-side amenities such as beach umbrellas, etc., provided.

(15) *Porbandar*.—(Rs. 5.00 lakhs)—It is proposed to extend facilities for tourists at Porbandar which is becoming increasingly popular on account of its association with Mahatma Gandhi.

A tourist bungalow with modern facilities and the development of the area between *Kirti and Bapu's house* as national monuments are proposed.

There is need to install a projector and build up a library of films and records on Gandhiji's life.

The extra facilities at Porbandar will cost about Rs. 5 lakhs.

Total for all schemes connected with Sasan-Gir-Veraval-Porbandar complex is estimated at Rs. 78.50 lakhs as under :—

	(Rs. in lakhs)
Sasan Gir	66.50
Somnath	7.00
Porbandar	5.00
	78.50

ernment of India will be requested to share the cost on important schemes

2.3.3.2 Ahmedabad Complex (Rs. 30.00 lakhs)

Ahmedabad Complex

	(Rs. in lakhs)
(1) Development of bird Sanctuary at Nal Sarovar ..	15.00
(2) Development of tourist spots around Ahmedabad ..	10.00
(3) Tourist bungalow at Ahmedabad	5.00
	30.00

(1) The bird sanctuary at Nal Sarovar, within easy motoring reach of Ahmedabad i proposed to be developed during the Plan period. (Rs. 15.00 lakhs)

	(Rs. in lakhs)
Accommodation, boating, recreation club, etc., ...	5.00
Dormitories	2.00
Exhibition hall with specimens of birds visiting Nal Sarovar and a library of books on birds	1.50
Observation towers and coaches	0.50
Purchase of boats	1.00
The present approach of the lake is from the Sanand side while the lake has a large area. A circular road with embankments will add to the amenities provided	5.00

The entire area of the lake is 120 square kms. It has 300 islets, a few of which are proposed for improvement with shrubs and trees. Nesting boxes to protect the birds against the elements will be provided. The development will have to be strictly along the lines suggested by noted wild life experts and on the lines of the suggestions made by Peter Scott for the Keoladeo Ghana Bird Sanctuary at Bharatpur. Please see Appendix C—Reprint from the journal of the Bombay Natural History Society by kind permission of the Director of the Society.

(2) *Development of tourist spots around Ahmedabad.*—A few of the spots around Ahmedabad need to be developed such as Sarkhej Roja, Chandola lake, the stepped well at Adalaj, Bhamario Kuvo at Mehmedabad, etc. (Rs. 10.00 lakhs).

(3) Modern tourist bungalow with full amenities at Ahmedabad. (Rs. 5.00. lakhs).

With the completion of the Wasna barrage on the Sabarmati south of Ahmedabad and the formation of a lake from Wasna up to Gandhi Bridge and, possibly, Dudheshwar, the whole of the Sabarmati river frontage beutification scheme prepared by Bernard Kohn could be taken up for implementation by the Municipal Corporation.

Palitana (Rs. 30.00 lakhs)

2.3.3.3 Palitana has over 850 marble temples located on Shetrunjaya hill. Apart from being a centre of pilgrimage for Jains who visit the place in large number, it is important from the point of view of tourists. Although Palitana is a small town, it has number of Dharmashalas and a Rest House but these are not suitable for tourists. The temples are on a steep hill. The

lift chairs available have their drawbacks. To make this place attractive, the following proposals are made :—

During the Fourth Five Year Plan, it is proposed to open a reception-*cum*-information centre at Palitana which will be expanded during this period by providing more facilities and amenities, *e.g.*, additional accommodation, garages, improved *dolies*, etc.,

(1) It is proposed to construct a motorable hill road (Rs. 25.00 lakhs). An attempt in this direction had been made in the past. The hill road will, it is expected, provide a much needed facility to tourists. It will be so aligned as not spoil the beauty of this place or reduce the vegetation cover.

(2) Tourists at this centre need easy transport facilities, These are proposed to be provided at a cost of Rs. 1.00 lakh.

(3) Tourist bungalow with modern facilities (Rs. 4.00 lakhs).

Dwarka (Rs. 7.50 lakhs)

2.3.3.4 Dwarka associated with Lord Krishna is visited by a large number of home tourists. The following are proposed at a cost of Rs. 7.50 lakhs :—

(1) Construction of low income group rest house and a dormitory at *Bet*-Dwarka (Rs. 2.00 lakhs).

(2) Improvement of selected Dharmashalas at *Bet*-Dwarka (Rs. 0.50 lakh).

(3) Tourist bungalow at Dwarka (Rs. 5.00 lakhs).

Improvement of Standards of Maintenance of Government Guest Houses (Rs. 5.00 lakhs)

2.3.3.5 The few suites in Circuit House in Gujarat, earmarked for use by tourists, have not been found to be enough . At a number of tourist centres, there is no arrangement for a night halt as the guest houses at these places are of a standard unsuitable for tourists. It is proposed to create a house keeping section, the function of which will be to look after all Government guest houses.

Modhera (Rs. 3.00 lakhs)

2.3.3.6 During the Fourth Five Year Plan, the cafetaria-*cum*-retiring rooms at the Sun Temple, Modhera will be completed. The construction of staff quarters and dormitories is to be taken up in the Fifth Plan. Here again, attention will have to be paid, as at all places of archaeological interest, that the buildings constructed in the vicinity blend with the surrounding and are in impeccable taste inside and out.

Tourists Offices at Calcutta, Udaipur and Jaipur (Rs. 5.00 lakhs)

2.3.3.7 There are at present two tourist offices, one in Bombay and the other at New Dehli. Both of them have been useful in providing information and assistance to tourists. It is proposed to open similar offices at Udaipur and Jaipur which are on the tourist route from Bombay to New Delhi and also one at Calcutta. Tourist information counters are opened at Ahmedabad Airport, Ahmedabad Railway Station, Dwarka, Ambaji, etc., at present. Information counters and tourist bureaus will be opened at important tourist spots and selected district headquarters.

Transport Facilities (Rs. 5.00 lakhs)

2.3.3.8 Additional air-conditioned tourist coaches are needed. They can be run either by ITDC or the Tourist Corporation of the State.

Foreign Publicity (Rs. 10.00 lakhs)

2.3.3.9 Gujarat has a number of tourist centres, some of which have all India tourist potential. No special publicity has been undertaken for these centres in foreign countries. The few tours so far arranged for foreign travel agents in Gujarat have shown very encouraging results. These need to be followed up systematically. It is proposed to provide a sum of Rs. 10.00 lakhs for the purpose in the Plan.

Hot Springs and Health Centres (Rs. 10.00 lakhs)

2.3.3.10 Gujarat has hot springs at Unai in Bulsar district, Lasundra in Kaira district, Tuwa in Panchmahals district and Tulshishyam in Junagadh district. The former State of Bombay had appointed a committee under the chairmanship of *Shri Homi Taleyarkhan, Parliamentary* Secretary to the then Chief Minister, to explore the possibilities of developing hot springs in the former State of Bombay as health centres. As a result, a health centre at Vajreswari near Bombay has been developed. It is necessary to explore the possibility of utilising spring waters at other places in Gujarat for curative purposes and developing these as picnic spots and health centres.

Unai is being developed in the Fourth Plan. It is proposed to develop Tuwa in Panchmahals district among others. Proposals are included in the Plan.

Development of Shamalaji as a Picnic Spot (Rs. 15.00 lakhs)

2.3.3.11 A Buddha *Stupa* has been excavated at Shamalaji in Sabarkantha district. This is a pilgrim centre situated half way between Ahmedabad and Udaipur on the National Highway.

It is proposed to develop this at a total cost of Rs. 15.00 lakhs by providing the following facilities :—

	(Rs. in lakhs)
Survey and preparation of master plan ;	2.00
Conversion of bungalows of the irrigation colony into holdiay homes	5.00
Garden, children's playground and other such facilities	8.00
Total ..	15.00

Development of Picnic Spots near Important Cities (Rs. 10.00 lakhs)

2.3.3.12 It is proposed to develop picnic spots near Baroda, Surat, Bhavnagar, Junagadh, etc.

Bhamario Kuwo (Kaira) Hathab-chanch (Bhavnagar), Wilson Hill (Bulsar), Chandod-Karnali (Baroda), Narayan Sarovar (Kutch), Tramba and Ghela Somnath (Rajkot), and Dhari (Amreli) would also be developed.

Improvement of Dharmashalas (Rs. 2.00 lakhs)

2.3.3.13 Dharmashalas serve the needs of the common man. It is necessary to take advantage of the facilities provided by these traditional houses which are mostly run by charitable institutions by equipping some of them at important centres suitably to provide modern facilities.

Ropeway at Girnar, Palitana, Pavagadh etc. (Rs. 40.00 lakhs)

2.3.3.14 Gujarat has beautiful mountains with shrines and temples on some of their peaks. Shetrunjaya hill at Palitana, Girnar at Junagadh and Pavagadh in the Panchmahals are places visited by lakhs of pilgrims and tourists round the year. To enable foreign as well as home tourists to go up the hills, it is proposed to provide motorable roads or rope-ways. A sum of Rs. 40.00 lakhs has been provided.

Launches and Boats for Coastal Conducted Tours (Rs. 15.00 lakhs)

2.3.3.15 Gujarat has a long coastline with 51 harbours, some of them being important pilgrim and tourist centres. It is proposed to organise conducted tours from Nargol to Bet-Dwarka and to cover some of the places on the coast of Gujarat. A provision of Rs. 15.00 lakhs for boats and launches for this purpose is made.

The Tourist Department of the Government of India has appointed a committee to consider beach tourism in India. With its long coast line and its beaches, the scope in Gujarat will no doubt have to be examined carefully.

Training of Personnel (Rs. 3.00 lakhs)

2.3.3.16 As schemes under tourism are implemented, the need for trained personnel will be increasingly felt., It is proposed to send personnel working in the Tourist Section for training in catering and hotel management, etc. A sum of Rs. 3 lakhs is provided.

It is necessary to cover all the staff including the managers, assistant managers, cooks, etc., particularly those concerned with foreign tourist traffic.

Apart from this, the importance of good service and food at holiday homes, rest houses, and all tourist places need no emphasis. In future, it is proposed to recruit only those who have attended courses at recognised management and catering institutions. Recruitment rules are being revised taking into consideration the job requirements and the training now available in our country.

Expansion and Modernisation of Existing Holiday Homes (Rs. 20.00 lakhs)

2.3.3.17 At present, Gujarat has six holiday homes at Ubhrat, Tithal, Shuklatirth, Pavagadh, Chorwad and Tulshishyam. During the Fourth Five Year Plan, a few more homes at Hajira, Dwarka, Navagam, Ukai, etc., will be added. All these homes have become very popular. It is, therefore, proposed to add to the number by providing accommodation and amenities for tourists. A few rooms in each holiday home may be air-conditioned. Canteen facilities may be improved to cover both vegetarian and non-vegetarian meals and modern equipment and communications may also be provided in existing holiday homes. It is, proposed to provide Rs. 20 lakhs in the Plan.

Development of Malsamot in Broach District as Hill Station (Rs. 20.00 lakhs)

2.3.3.18 Saputara is being developed as a hill station at present. It is proposed to develop Malsamot in Broach district or any other suitable place in the State as a hill station during the Plan period. A sum of Rs. 20 lakhs is proposed.

Strengthening of the Tourist Section (Rs. 6.00 lakhs)

2.3.3.19 The Tourist Section is functioning as a branch of the Information Department at present. With the implementation of serveral schemes during Fourth Five Year Plan and those proposed for the Fifth and Sixth Plans, it will be necessary to strengthen the section and [illegible] it into a Directorate of Tourism. For this purpose, it will be necessary to man it [illegible] and efficient staff. A sum of Rs. 6 lakhs is provided. Necessary staff at all [illegible]

should also be provided. Once the Tourist Corporation is set up, a good deal of reorganisation of this proposed Directorate of Tourism will become necessary.

Hotel and Motel Facilities (Rs. 10.00 lakhs)

2.3.3.20 An increasing number of tourists visit Gujarat by road. It is desirable to increase the outlay on motels, particularly on National Highways. It is proposed to encourage the establishment of motels near Ahmedabad, Junagadh, Baroda and Shamalaji. In order to augment way-side facilities for promoting road tourism, Government of India propose to establish about 20 camping sites and 7 to 10 motels to meet the immediate needs of the domestic as well as the rapidly growing overland traffic of foreign tourists, which reached the figure of 21,878 tourists during 1970. By 1973, about 4,00,000 tourists are expected to visit India and during the Fifth and Sixth Plans period, this figure may perhaps be more than doubled. Plans for camping sites and motels have been specially prepared for the Department of Tourism, Government of India, in consultation with experts on tourism. The State Government also intends to adopt these plans, with such changes as are necessary. Motel will be a commercial proposition. The general amenities at the sites would include washrooms, toilets, grocery stores, snack bars, direct electricity connections at each camping platform, dormitory for drivers, space for parking of cars, vehicles, mini-buses, coaches, etc. The motels will be equipped with modern accommodation and basic items of furniture. Repairs and service facilities for cars being an essential feature of motel, care will be taken to see that permission for location of petrol pumps is readily available at motel sites. A small ad-hoc body should be formed out of the Tourist Advisory Committee to select locations for camping sites and motels. The siting of these places and the control of their surroundings is of the utmost importance. Please see Appendix D.

Self Drive Cars on Hire

2.3.3.21 There is already a distinct trend towards '**do it yourself**' **tourism.** Foreign tourists will increasingly want to arrive by air at, say, Ahmedabad or Baroda or Rajkot and expect a self-drive, reliable and comfortable car to be available as they step out of the air terminal. With the greatly improved road system of Gujarat and the large number of 'returning' Gujarati tourists from abroad, there is considerable scope for this service which could be provided by the Tourist Corporation or private entrepreneurs. Despite procedural relaxations, returning Gujarati tourists from, say, East Africa should find that bringing their own family car under a *Triptyque or Carnet de Passage* is very much more expensive and cumbersome. If Gujarat provides this service first with thoroughly reliable locally made cars, it can steal a march over other tourist regions.

Establishment of a Tourist Corporation (Rs. 110.00 lakhs)

2.3.3.22.1 The proposal earlier submitted to Government to establish a Tourist Corporation in Gujarat, as in some other States, needs to be revived. This was discussed by the State Advisory Committee for the Development of Tourism under the Chairmanship of the Governor during September, 1971 when it was decided that such a Corporation ought to be established in Gujarat. Details of the proposal submitted to Government are in Appendix E. It is proposed to provide Rs. 110 lakhs for this. *This should be regarded as the single most important recommendation in the Report. The need is immediate.*

2.3.3.22.2 Once the Corporation comes up, much of the outlay on tourism in Gujarat would be channelled through it. The amount of Rs. 110 lakhs is proposed to be provided for the Corporation by way of its equity and loan capital but all the other outlays mentioned in the Plan, except those which may be specially kept for the Directorate of Tourism, could well be by the Corporation. It is the Corporation which will have to go into the details of the hotel beds required, the type and number of road transport, etc.

2.3.3.22.3 It should be noted particularly that although the development of a number of places has been mentioned in the Plan, this should not be taken to imply that the Tourist Corporation will take up all these schemes during the Perspective Plan period. Depending upon

its assessment of the situation, it may well decide, after considering all aspects, not to spread its resources too thinly and may intensively develop a few tourist spots with high tourist potential early in the Plan period, taking up other schemes as permitted by the availability of monetary and other resources.

For Tourist Statistics and Schemewise Outlay, please see Appendices F and G, and for important Tourist Centres of Gujarat, the Tourist Map.

It is recommended that this Report is read with that on Civil Aviation. The Maps in that Report and in the Road Development Report should also be seen.

CHAPTER - III

SCHEMES CONNECTED WITH THE DEVELOPMENT OF PLACES OF ARCHAEOLOGICAL IMPORTANCE

3.1 Introduction

3.1.1 Gujarat is very rich in ancient monuments. Out of 400 sites, 192 are centrally protected while the remaining are looked after by the State Directorate of Archaeology. Lists of some of the important monuments are at Appendix 'H'.

3.1.2 Even after the formation of Gujarat in May 1960, there was no separate Department of Archaeology. It continued to function under the Director of Education, Ahmedabad, with an Archaeologist at Rajkot whose designation was later changed to that of Assistant Director of Archaeology.

3.1.3 With the increasing emphasis on Archaeology, Government created a separate and independent Department of Archaeology in November 1964 under the Director of Archaeology who was placed directly under the control of the Secretary to the Government in the Education and Labour Department.

3.1.4 The functions of the Department are :—

(1) Village to village survey of the whole of Gujarat.
(2) Exploration of all the river valleys of Gujarat.
(3) Listing of monuments in Gujarat—400 monuments have so far been listed. Their repair, conservation, beautification, and electrification are to be undertaken.
(4) Excavation of selected sites.
(5) Publication on important topics.
(6) Under the legislations, the Director acts as the Guardian of Monuments and as the Treasure Trove Officer of the State.

3.1.5 Gujarat has proved to be a paradise for the archaeologists because of the number of discoveries recently made. Several missing links in pre-historic and proto-historic periods, dating back from 300,000 to 4000 B. C. have been brought to light by exploration and excavation in Kutch and at Rojdi in Rajkot district, from the Buddhistic caves in South Gujarat and at Prabhas Patan near Veraval.

3.2 Schemes Proposed

3.2.1 Given the required funds, adequate staff on suitable time scales and encouragement from the public and Government, much more can be done. Technically qualified staff will have to be attracted with revised pay scales and suitably graded posts. The Third and Fourth Plan outlays enabled the maintenance of a skeleton staff to protect a few of the monuments. As much remains to be done, the following important schemes are proposed for the Fifth and Sixth Plans :—

	Outlay (Rs. in lakhs)
(1) Exploration	7.10
(2) Excavation	8.00
(4) Conservation	8.00
(4) Publication and Library	1.15
(5) Reorganisation of the set-up and intensification of the conservation efforts.	20.75
Total ..	45.00

3.2.2 When implemented, these schemes will help in saving these momuments for posterity and also serve to bring out their beauty not only for the citizenes of our country but for visitors from abroad.

Places of Archaeological Importance are shown in the Map.

3.3 Details of the Proposed Schemes

3.3.1 Exploration

3.3.1.1 Though Gujarat is very rich in archaeological remains, very little has been done in exploring the region for pre-historic, proto-historic and early-historic material. The footsteps of early man are to be traced. The River Valleys are to be explored. The route of the march of the Harappan people through Saurashtra is to be determined. Village to village survey of the whole of Gujarat is to be undertaken. The original location of Dwarka and sites having relation with Lord Shri Krishna are to be ascertained. There is much work to be done even in the historic period from the rule of the Mauryas to the rule of the Maitrakas, Saindhavas and Solankis. Early medieval history is also to be traced and many chapters in the History of India about Gujarat are to be added.

3.3.1.2 Some important pre-historic and proto-historic sites (Harappan culture) have been explored in Saurashtra. Microlithic industries showing links with the cultures of the Narmada Valley and the Middle East have also been explored mainly in the Jamnagar district of Saurashtra. Important stone inscriptions and copper plates of the early historic period have also been discovered and published. All these indicate the importance of the exploration work in this region. Some important temples of different ages have already been discovered and there is likelihood of discovering more, supplying the missing links in the development of temple architecture in Gujarat.

3.3.1.3 The remains explored will be utilised to enrich the museums of Gujarat and to develop site museums. Archaeological supervisors will be in charge of the local monuments and sites discovered in their respective places. Their services will also be used in educating the public.

3.3.1.4 *Details of the Scheme.*—The following exploration work will be taken up during the Plan period :—

(1) Bhadar River Valley survey in Saurashtra.

(2) Village to village survey of Amreli, Bhavnagar, Kutch, Banaskantha and Sabarkantha districts.

(3) Ambica River Valley survey in Surat district.

(4) Village to village survey of Chhota-Udaipur taluka in [illegible]

(5) Village to village survey of Dharampur taluka in [illegible]

(6) Village to village survey of Dediapada taluka in [illegible]

(7) Village to village survey in Dangs [illegible]

(8) Village to village survey of [illegible]

(9) Village to Village survey of [illegible]

(10) River Valley survey of the [illegible]

3.3.2 Excavation

3.3.2.1 *Scientific excavation*—Scientific excavation is necessary to find out the story of the past cultures of mankind. The history of peoples from the pre-historic period onwards can be revealed only by scientific excavation in the correct regions and exact sites in Gujarat. There are many missing links in the pre-historic, proto-historic and early-historic periods of India. Many knotty problems regarding the various archaeological periods are to be solved. After scientific explorations of the various sites and River Valleys, excavations are necessary. This branch of Archaeology can supply ample evidence resulting in a continuous story of mankind and the supply of material to arrange pre-historic and early-historic galleries in the museums.

3.3.2.2 *Background information and current position.*—The geographical situation of Gujarat is very important as she had maintained cultural contacts with the Indus Valley and Gangetic Valley civilisations. Through different routes during the turbulent periods in the history of India, various groups have penetrated Saurashtra for shelter together with their various cultures. The condition of the region of Saurashtra and Kutch will supply many cultural evidences to give a continuous cultural sequence from the proto-historic period onwards. Some important sites representing the various settlements of Harappan culture have already been explored/excavated in Gujarat. There are Puranic legends about the Mahabharat period (proto-historic) on account of the settlement of the Yadavas and Lord Krishna in various parts of Gujarat. There are enough evidences regarding the Mauryan, Kshatraps and Gupta Rule in Saurashtra. There are also different connected historic evidences about the rules of Maitrakas of Valabhi, Saindhavas of Ghumah and Solanki. All these data furnish a poly-sided background for the archaeological research work to be taken up.

3.3.2.3 *Objective of the project.*— The aim is to find evidences about the Paleaolithic, Microlithic and Iron Age cultures in Gujarat. There are already important sites to supply a continuous ceramic sequence from the proto-historic period to the medieval historic period of Gujarat. The project will unearth the important sites of Harappan culture, Microlithic culture and places yielding the cultural remains from the times of Lord Shri Krishna to the historic periods, *viz.*, Mauryan, Kshatrap, Gupta, Valabhi, Solanki and so on.

3.3.2.4 *Details of the Scheme.*—The following excavation works will be undertaken during the Plan period :—

(1) At Rajadi in Gondal taluka, district Junagadh.

(2) At Uparkot in Junagadh, district Junagadh.

(3) At Kadiya Dungar in Jhagadiya taluka, district Broach.

(4) At Vihod in Hansot taluka, district Broach.

(5) At Patan in Patan taluka, district Mehsana.

(6) Trailpits in Daskroi taluka, district Ahmedabad.

(7) Khirsara in Nakhtarana taluka, district Kutch.

Proposed Outlay (Rs. 8.00 lakhs).

3.3.3 Conservation

3.3.3.1 Due to lack of funds many of the monuments are in a ruined condition and require urgent scientific treatment to conserve them. As Gujarat is not thoroughly surveyed, there is every possibility of several more monuments and sites being discovered also. There are no approach roads to several monuments.

3.3.3.2 It is our duty to preserve and conserve the monuments of historical and archaeological importance. Gujarat is rich in her cultural heritage. There are various monuments, secular as

well as religious. Each one presents a cultural, social and economic study of its own. Each one has its importance in the reconstruction of the cultural history of Gujarat. Most of them are at a distance from the highways and at times difficult to approach.

3.3.3.3 The purpose of the project is to undertake systematic conservation and preservation of the monuments so that they are well protected. Approach roads up to the site of the monuments and archaeological gardens will be provided, wherever possible. Some of the sites will be provided with electricity.

3.3.3.4 *Details of the Scheme.*—Sign boards to replace the old ones will be provided as also history tablets near the monuments. Annual repairs will be undertaken and chowkidars and guidess for groups of monuments will be appointed to look after them. Special repairs will be carried out in stages to monuments of importance. Plans and sections of the monuments will be prepared. Photographs of the conservation will be taken and historical notes be prepared for publication and record. Models of important monuments will be made and exhibited in museums together with drawings and photographs. Due regard will be paid to the preservation and conservation work on these monuments discovered during the exploration programme.

3.3.3.5 Conservation works will be undertaken at the various monuments such as temples, caves, *Kunds*, step-wells, tanks, forts, mosques, pavilions, and sites, etc. Important monuments are to be beautified with gardens and provided with electricity. Quarters for the watch-and-ward staff will also be provided at fourteen locations together with store rooms during Fifth and Sixth Plans.

Proposed *Outlay* : (*Rs. 8.00 lakhs*).

3.3.4 Publication and Library

3.3.4.1 The systematic publication of Reports of Archaeological Research Works and especially of excavations is of the greatest importance. A library is the prime requ site for good publications as books, magazines, reports on research works on various subjects are required for reference and study.

3.3.4.2 Enough material remains in Gujarat for publications, catalogues of inscriptions, small guides and pamphlets, books, slides on art, sculptures and architecture and the beauty spots of Gujarat are still to be published. Publications on the monuments of Gujarat are not available for learned societies as well as for the masses.

3.3.4.3 *Objective.*—The aim of the project is to make people aware of their cultural heritage in Gujarat so that they are prepared to protect cultural remains such as temples, mosques, step-wells, etc., scattered all over the State.

3.3.4.4 The following items will be taken up for publication : (1) Monument Guides (2) Detailed Classification and Catalogues of Inscriptions (3) Guides on important historical and cultural places and beauty spots (4) Coin Catalogues (5) Archaeological Atlas of Gujarat (6) Exploration and Excavation Reports (7) Annual Archaeological Reports/Journal of Gujarat. Also, books and journals on archaeology, history, geology, anthropology, art, geography and other allied subjects will be purchased.

Outlay during Fifth and Sixth Plans (*Rs. 1.15 lakhs*)

3.3.5 Reorganisation of the Set up and Intensification of the Conservation Effort

The aim is to develop and strengthen the Directorate in order that it may be ready not only to tackle the schemes included in the Fifth and the Sixth Plans but also provide [illegible] technical and other supporting staff such as archaeological engineers, photographers, [illegible] technicians, laboratory assistants, monument watch-and-ward staff, guides, etc.

Outlay during Fifth and Sixth Plans .

APPENDIX A

PRIVATE CAPITAL EXPENDITURE ON TOURIST PROJECTS IN ENGLAND SUPPORT BY THE ENGLISH TOURIST BOARD.

By the late 1970's tourist spending is expected to reach £ 2,000 million a year....

That means exciting opportunities for development, particularly in areas where the new tourist potential has not yet been recognised.

To get a new tourist project under way needs foresight, creative ideas, drive–and hard cash.

The English Tourist Board has funds available to support capital expenditure on tourist projects in the Development Areas of England.

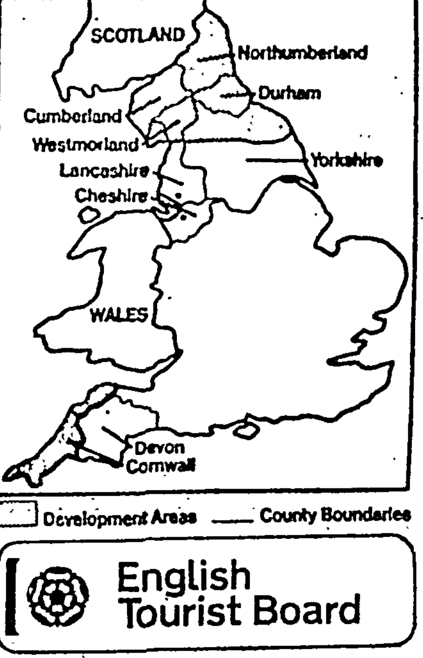
Does Your Project Qualify?

There are only three general conditions :

1. Your project must be in an English Development Area–see map.

2. Projects must involve capital expenditure (*i. e.* the money must help to create a physical asset).

3. From April 1, 1972, projects will only be supported if they have our approval before work is started.



In addition, projects should :

– be designed to create employment, directly or indirectly ;

– be designed to attract tourists, both from the U. K. and abroad ;

– be designed to increase tourist spending ;

– be open to the public generally (*i. e.* not restricted to a club or to some particular section of the community) ;

– need our support.

Projects relating to tourist accommodation will be considered and particular attention will be given to :

– areas in which accommodation is now deficient in quantity or quality ;

– smaller hotels and inns of historic interest or special character ;

– camping and caravan sites where there are plans to improve standards in consultation with us.

The Kind of Projects We Want to Help :

A. Non-commercial Projects where the applicant is unlikely to make a reasonable profit and might incur a loss without ETB financial assistance. Also projects where conventional profit and loss accounting would not apply.

These may be divided into :

Loss Leaders Projects which offer attractions (of the right quality and at the right price) to draw into the region substantial numbers of tourists whose spending on other facilities, such as hotels and restaurants, would amply benefit the regional economy. These might include museums, art galleries, theatres, wild life sanctuaries, historic buildings ands ites with special character and appeal to tourists, and projects to provide accommodation for tourists visiting these attractions.

Example : the ETB has made a grant towards rendering secure the exhibition hall on an ancient abbey so that valuable art collections can now be shown there.

Amenities : Projects not necessarily with a high pulling power themselves but likely to make a tourists' stay more satisfying or to improve the organisation of tourism in the region. These would include car parks, information services, signposting, countryside walks, picnic sites, parks and gardens, sporting facilities,

APPENDIX A—*contd.*

B. Pace Setters : Here we are seeking projects *(including accommodation)* which are essentially looking ahead to the needs of tomorrow's tourism. Because they contain a pioneering element they may not offer, without ETB assistance, an acceptable level of profit within a reasonable length of time.

These projects will be ahead of their time in terms of :

Concept : Entirely new ideas where the pioneering risk is great, especially where a certain minimum size prevents a slow build up of operations.

Design : Radically new designs for known types of tourist attractions or amenities where special risk and costs may be involved.

Quality : Substantially new standards of quality for tourist attractions or amenities that already exist in roughly similar form.

This element of pace setting may occur in conjunction with changes in design.

Example : A grant and loan towards the cost of a caravan park near Hadrian's Wall for 55 touring caravans, setting new high standards in facilities and environment.

Location : Projects involving the risks of bringing together a number of attractions in a new tourist environment.

Example : A loan for the restoration of a disused mining railway in the West Country. The new railway will give tourists a round trip of 9 miles. Four stopping points will offer: *a restaurant, bar and children's playroom*; exploration of several old mines; pony rides over the moors; and a walk to a reservoir with opportunities for fishing and boating.

C. Tourist infrastructure Projects seeking to create the basic structure upon which tourist facilities and services can develop. These would differ from 'amenity' projects listed above because of their much greater cost and likely longer time scale.

We have no hard and fast rules on the specific types of projects ; the categories above are only for guidance. We will consider every application on its merits, paying particular attention to the amount of ETB financial *assistance sought for the projects in relation to* the contribution it seems likely to make to the regions' prosperity.

Of special interest are projects that fit in with the kinds of tourism a particular region wants-for example extending the season, or developing the lesser known parts of the region, or attracting tourists with special interests.

Forms of ETB Financial Support :

Our support may take the form of a loan a grant, a mixture of both, or in rare cases the acquisition of shares. Our philosophy is to help applicants to help themselves and, in line with this philosophy, wherever practicable we aim to lend public money rather than make outright grants. The type of support offered is at our discretion, after consultation with the applicant.

In general, support for projects in category A above would tend to be weighted in favour of grant. In categories B and C the accent would be on self help and therefore on loans, though a small element of grant might not be ruled out.

Commercially sponsored projects will not normally qualify for total assistance from national or local public funds in excess of 50 per cent of the cost of the project, and ETB's own participation in any one project will not exceed 49 per cent of the cost.

Interest on loans will be at the Government lending rate appropriate to the length of the loan. *In certain circumstances up to* three years moratorium on repayments may be given.

Funds will usually be paid when the work is completed, although in some cases it may be possible for instalments to be advanced subject to satisfactory evidence of expenditure.

How to Apply :

If you think your tourist project may be eligible for support, write to the appropriate regional tourist board-see list of addresses-for application form TB / 10 and explanatory booklet. After assessing your

APPENDIX A—*concld.*

relation to local knowledge and needs, the regional board will pass it on to us, together with its own advice.

All applications, which will be treated in strict confidence, will be finally considered at the headquarters of the English Tourist Board, whose decision is final. The ultimate responsibility for deciding on each application rests with the English Tourist Board and its staff, and it is from ETB headquarters that a detailed marketing and financial appraisal of each application may be made.

....

....

Your regional tourist board or nearest employment exchange can advise you whether your project lies in a Development Area.

APPENDIX B.

GUIDELINES FOR WILD LIFE CONSERVATION

Points, set out by the Expert Committee of the Indian Board for Wild Life for the Conservation of Wild Life : These must be borne in mind when developing Tourism connected, in any manner, with Wild Life in Gujarat such as the sanctuaries in the Gir Forest (Lions), Nal Sarovar (Migratory Birds), Little Rann of Kutch near Tikar (Wild Ass), the Greater Rann (Flamingoes), blackbuck areas (Velavadar, and (Victoria and Rozy Parks), the Dangs forests, etc :—

(i) There is need to minimise human disturbances and ecological imbalances in national parks and sanctuaries on the basis of a realistic appraisal of the past.

(ii) Since denudation of forests is harmful to the continued existence of Wild Life, it is essential to resist ceding of forest areas to stop further destruction of wild life habitat.

(iii) Preservation of Wild Life must be ensured before taking up any new hydel or industrial project. Each major project should have a Conservation Officer to safeguard wild life.

(iv) Natural marshy* and pasture lands should be protected and developed wherever there is ecological necessity. Vegetation in the catchments of major hydel projects-Narmada, Ukai, Panam, Dharoi, etc. should be protected to ensure conservation of soil and water and Wild Life.

(v) The location of major industries likely to pollute natural environment should be decided after an appraisal of ecological factors.

(vi) Comprehensive legislation to cover non-forest areas also on the lines of the Maharashtra Wild Animals and Birds Protection Act should be enacted and enforced urgently.

(vii) Legal protection to as many endangered species as possible for their perpetuation. Total ban on killing or trapping.

(viii) Alienation of Wild Life habitats must be stopped.

(ix) Departmental collection of forest produce should be introduced in exclusive Wild Life habitats to stop destruction of Wild Life.

(x) Grazing should be excluded from national parks and strictly controlled in sanctuaries.

(xi) Crops should be protected from pests by a State Wild Life Organisation so that crop protection gun licensing is discouraged and later stopped altogether.

(xii) There should be a separate Wild Life Wing in the Forest Department exclusively to protect and propogate Wild Life.

(xiii) Areas under sanctuaries and national parks must be increased to provide sufficient habitat for the perpetuation of local species. (National Parks legislation).

(xiv) More funds must be provided for Wild Life Conservation.

(xv) Publicity for Wild Life conservation must be given through the media of the radio, television, newspapers and, later, by casettes, video-tapes and other audio-visual aids. Study of Wild Life should find a place in school curricula.

(Adapted with acknowledgements : World Wild Life-India Newsletter, December, 1971.)

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*For Nal Sarovar, the advice of eminent experts such as Salim Ali, Peter Scott, Dr. Hoffman (the Camargue Sanctuary) etc., should be sought.

APPENDIX C

SUGGESTIONS OF PETER SCOTT ABOUT KEOLADEO GHANA SANCTUARY, BHARATPUR

(Reprint from *Journal, Bombay Natural History Society, Vol.* 63 (1) : 206-209. 12th October 1966).

MISCELLANEOUS NOTE

—

9.—VISIT BY IUCN DELEGATION TO THE KEOLADEO GHANA SANCTUARY, BHARATPUR, RAJASTHAN, INDIA

(*With two plates*)

A party of some twenty people visited the Ghana, arriving by bus at 2.30 p. m. on Thursday 25th November and leaving again at 10.15 a. m. on the following morning. Conditions at the Sanctuary were said to be unusually good, in that migrant birds from the north were already present in some strength, while due to a late monsoon the breeding colonies of storks, herons, ibises, and cormorants were still occupied, many of the nests containing quite small young. During the very short period spent at the Sanctuary (and including the journeys to and from Delhi), some 130 species of birds were identified. Also seen in the Sanctuary were Blackbuck (*c.* 40), Nilgai (*c.* 10), Chital (*c.* 50), Sambar (3), and Wild Boar (2). A panther was seen as it crossed the road.

....

....

We saw most of the waterfowl species recorded from the area, and a splendid concentration of from 3-4000 Greyleg Geese, as well as 150 Barheaded Geese and large flocks of ducks of 15 species, including Cotton Teal.

During the afternoon other members of the party had no difficulty in finding and photographing blackbuck and other antelope, or went by boat to see the colonies of breeding birds in small trees standing in shallow water. These included Painted and Openbilled Storks, Spoonbill, White Ibis, Grey Heron, 3 species of White Egrets, Darters, and two species of Cormorants.

....

The Ghana Sanctuary consists of some 7000 acres (*c.* 11 sq. miles) of which about one-third is artificially flooded plain. Banks or bunds provide a number of shallow pans, some of them a square mile or so in extent, which fill at the time of the monsoon in late summer and gradually dry up during the rest of the year. These man-made lakes are surrounded by a forest of low trees and shrubs—mostly *Acacia, Zizyphus,* etc. The pans are grown up with many species of water plants so that, at the time we were there, little clear open water was to be seen, though over large areas the vegetation did not rise above the surface. Some trees grew along the bunds, on small islands, and in standing water.

After so short a visit it is difficult to draw valid conclusions or make positive recommendations, but certain impressions seem worth recording.

First, the Keoladeo Ghana Sanctuary can provide as fine a spectacle of large water birds as is to be seen anywhere in the world, enhanced by the presence in the vicinity of some of India's most beautiful mammals, of which three at least can be seen without difficulty by any visitor. Secondly, the Sanctuary is not yet a true sanctuary among other reasons because of the considerable amount of shooting which takes place and because of serious overgrazing by domestic animals. Thirdly, the potential use of the wild life in this area as a tourist attraction, for the purposes of education and as a basis for scientific research, is capable of very substantial development at no very great capital cost. It is assumed that such development would have the approval of both the Indian Government and the Government of Rajasthan.

The following suggestions are therefore put forward :

(1) That the sanctuary should be zoned to provide a demarcated area of not less than 3 sq. miles as a strict reserve or true sanctuary, in which no shooting or other disturbance should

APPENDIX C—*contd.*

ever take place, and into which no domestic livestock may enter. It is particularly important that this area should *not* be disturbed by beaters (with or without fire-crackers) on shooting days.

(2) That in the zone or zones set aside for wildfowl shooting and in order to ensure that the quality of such shooting is properly maintained, shooting should take place on a small number of days to be agreed with H. H. the Maharaja, preferably not more often than once every 2 weeks (and never on other days) during the open seasons permitted by the law.

(3) That the privilege of grazing domestic animals in the Sanctuary should be strictly controlled in accordance with sound range management principles, which would certainly involve a drastic reduction in present numbers. The factors involved should be carefully studied: for example, although dung deposited on dry land is carefully collected by the graziers for fuel and other purposes, it is possible that the domestic ungulates fertilize the water to the advantage of many water-bird species and that this fertilization is a significant factor in the wildfowl concentrations. Nevertheless it is likely that something of the order of 1500 domestic livestock feeding in the area would be far better land use practice from every point of view—Sanctuary, shooting, and the interests of the livestock and their owners—than the present 5600. The recent reduction of domestic grazing by excluding buffalo and cattle during the night is commended as a wise and practical limitation and should be continued.

(4) That at least 12 observation points should be constructed at very carefully selected points where numbers of birds or mammals may concentrate (or be persuaded to concentrate). It is vital that these huts be so placed, and the approaches so screened with reed walls, that observers and photographers can get into and out of the observation points without disturbing the birds or mammals which may be close by. (Plates I and II).

(5) That disturbance to the breeding colonies of birds should be reduced by not allowing boats to go amongst the trees in the main breeding area (where observation towers would provide better facilities for photography). During our visit the boats went so close to the trees that some young birds fell into the water and were drowned. It is essential that boatmen employed in the Sanctuary should, like all other staff, be given a short training course and properly supervised.

(6) That facilities for the accommodation of tourists at the Rest House in the Sanctuary be improved and extended so as to be able to accommodate at least one bus-load of tourists (c 30-35)- preferably two. Standards of comfort must conform to those expected by the majority of travellers visiting India, but this does not rule out the necessity for a proportion of simple, well-designed accommodation within the reach of lower income brackets.

(7) That the Rest House extension should include a dining room and lounge overlooking a substantial expanse of open water so that birds can be observed from these rooms (as well as some of the bedrooms). Mammals should also be accustomed to visiting the area immediately in front of the building by the judicious siting of a salt-lick and by providing an open grass area (periodically cut if necessary) to attract ungulate species to the fresh grass. Needless to say the domestic animals would have to be totally excluded from the Rest House vicinity.

(8) That the area in front of the Rest House should be regularly floodlit during the evening. A device to allow the lights to fade *gradually* at 11.0 p. m. or midnight, rather than being left on all night, as is the practice at the very successful Tree Tops reserve in Kenya, would probably be best suited to local circumstances and to the 2 to 3-night stay in the Sanctuary which could be expected to interest the ordinary tourist.

(9) That a charge of Rs. 10 per person be made for all foreign tourists visiting the Sanctuary as a contribution to the cost of its proper management which would certainly be [illegible] indeed normally expected. Consideration could be given to introducing

APPENDIX C—*concld.*

say one rupee, for Indian nationals, if only to emphasize the value of the Sanctuary, but children under 16 should be allowed in free.

(10) That there should be no introduction whatever of exotic species into the Sanctuary. As emphasized in our general report such introductions are always to be avoided and even re-introductions or artificial amplification of stocks of existing species needs very careful study if it is not to have adverse effects on the habitat and general balance of the fauna.

(11) That facilities be provided for School Parties to visit the Sanctuary and to be shown round by guides capable of explaining its objects and describing the fauna and flora in some detail. Such visits should include access to the special observation points from which the wild life will be seen at especially close quarters.

(12) That facilities be provided for student field study in certain specified parts of the Sanctuary.

(13) That a small research station should be established to form a focal point for all scientific studies taking place in the Sanctuary. For this purpose funds might be sought from international sources such as the World Wildlife Fund.

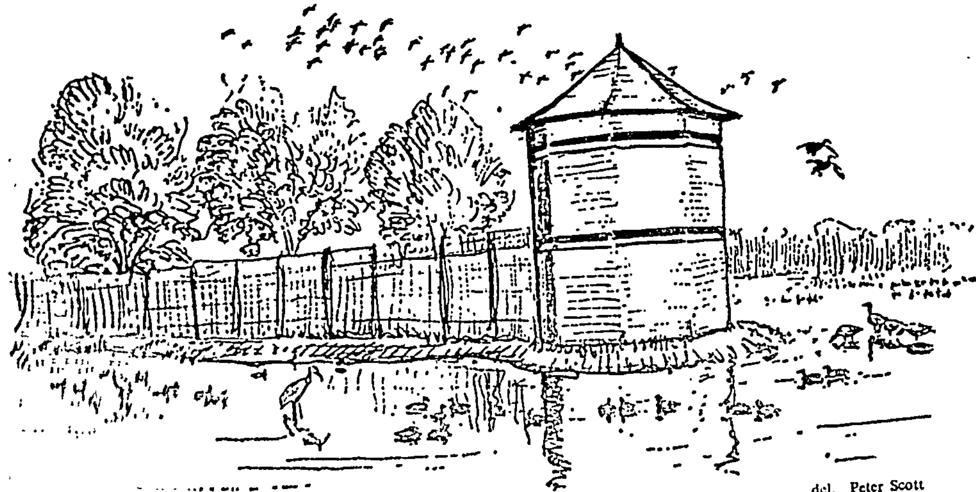
(14) That very complete check lists be drawn up for the Sanctuary, available in printed form for the tourist, and that 'field guides' on the Indian fauna and flora should also be available for purchase. It is of the highest importance that these should be scientifically impeccable. This need not make them in any way less attractive to the casual visitor, and the standards of the Sanctuary will be judged by the care with which this sort of literature is prepared.

(15) That as soon as the improved facilities exist (but on no account before), the Sanctuary and its unique interest should be publicized, both nationally and internationally, but especially the latter, on as wide a scale as possible.

For such publicity the assistance of many organizations is available and might well be sought, e. g., the Fauna Preservation Society, the Audubon Society (U. S. A.), the Royal Society for the Protection of Birds (U. K.), the Frankfurt Zoological Society (West German Republic), the Wildfowl Trust (U. K.), and the World Wildlife Fund (Switzerland).

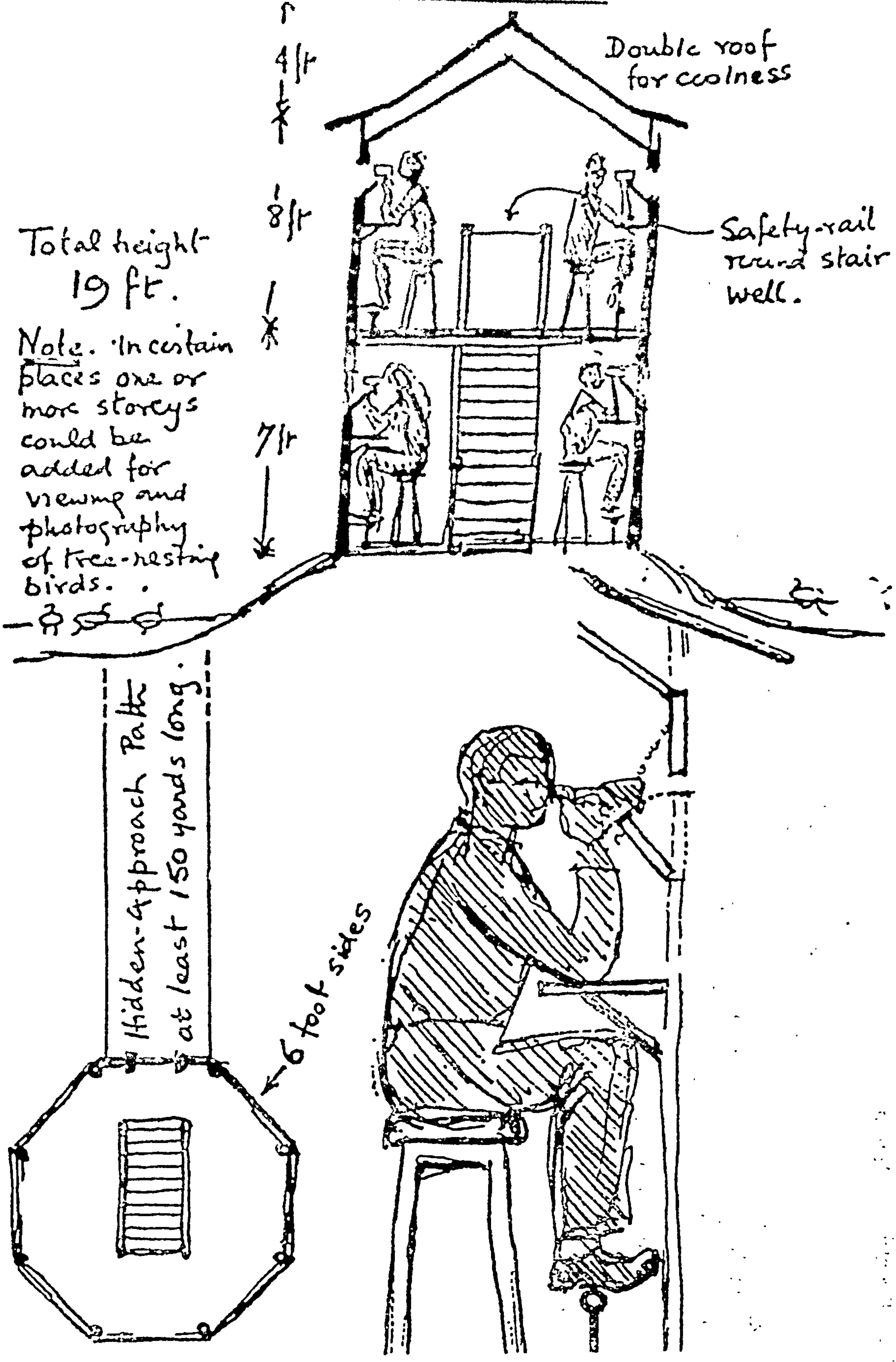
SLIMBRIDGE WILDFOWL TRUST,
SEVERN, GLOUCESTERSHIRE,
ENGLAND,
May 25, 1966.

PETER SCOTT



Bird Observation Hut : Elevation

For details of construction, see Plate II



del. Peter Scott.

Bird Observation Hut: Details

APPENDIX D

SITES FOR MOTELS AND ROAD SIDE CAMPS

1. Motels may either be privately owned or put up by a semi-autonomous body such as ourist Development Corporation. The former Director-General of Tourism Shri S. K. Roy l planned to entrust the *management* of individual motels to husband-wife teams, the selection be from ex-Armed Forces officers and others who know the requirements and who can provide necessary service to tourists. The managers must have personal experience over a long ne of good food, cleanliness standards, pleasant decoration, maintenance, etc. They must ve operated cars, etc., and know the problems of travellers moving by cars over long distances.

2. The locations are most important.* In this, the following factors among others, will ve to be borne in mind :—

(i) The National Highway of the future from Ahmedabad to Bombay, and, possibly, from Ahmedabad to Delhi will be a 4-lane Super Highway, with limited entry and exit. The motels, etc., will have to be located bearing the limited exits and entries in mind and as also the toll collecting stations.

(ii) The beauty of the spot is also important.

(iii) The site should have lawns, trees, hedges.

(iv) It should be in peaceful surroundings away from the noise of nearby villages-dogs barking, industrial noise, railways, etc.

(v) It should also be away from pollution centres.

(vi) As television and radio will have to be used for entertainment, it should be away from high tension and extra high tension lines.

(vii) The security of the site is also important

3. There should be facilities not only for the repair of cars but also for their cleaning and servicing at night while the traveller sleeps before moving on to the next motel.

4. Quick laundering arrangements for clothes are necessary.

5. Sufficient medicines, provisions, etc., should be available on the spot.

6. Instead of a standardized design for all the motels in Gujarat, the external as well as ternal design should vary so far as decor is concerned.

7. The amenities available should be of a specification high enough for foreign tourists. the same time, a number of rooms should be available for persons of modest means.

8 There should be provision for entertainment, wireless / television, video sets eventually

9. A swimming pool or some other arrangement for sport and relaxation should be provided

10. Air-conditioning in a certain number of rooms must be provided. Instead of [illegible] air conditioners, bulk airconditioners ought to be installed.

*They may be considered by a small ad hoc body [illegible]

APPENDIX D—*concld.*

11. The rooms must be sound and light proof. This is most important for travellers' rest.

12. There should be electric alarm clocks in each room.

13. The special needs of children travelling by road should be catered to.

14. The disposal of wastes from the motels and camping sites should be properly attended to from the beginning.

15. *Non-agricultural use of land in the area surrounding the motel/camping site, should not be allowed otherwise slums will spring up on all sides of it.*

APPENDIX E

ESTABLISHMENT OF GUJARAT TOURIST CORPORATION FOR THE DEVELOPMENT OF TOURISM

Tourism is more of an industry than a welfare or promotional activity and it is t viewed and assessed as such all over the world as also in India. It brings in a good dea foreign exchange and aims at providing facilities more or less on commercial lines. It has a go multiplier effect on the economic regeneration of any territory. It has been estimated that eve Rupee spent by a tourist multiplied several times the economic resources by the investment o that Rupee into several other fields. Such commercial activity is best conducted by a Corpo ration rather than a Department or Directorate of Government. It is because of this that the Gujarat Government and other Governments have established Corporations such as those in the fields of industrial development, industrial investment, mineral development and so on. The thinking on Tourism is also in the direction of establishing Tourist Corporations for promoting tourist facilities and tourist traffic. In the eighth meeting of the Tourist Development Council held at Srinagar in July, 1964, under the Chairmanship of Shri Raj Bahadur, the then Union Minister of Transport, the recommendations made by the Jha Committee for setting up Corporations were discussed. The Chairman explained the idea behind the recommendation for setting up corporations, one for the construction of hotels and the other for organising transport facilities, entertainment, production and sale of tourist publicity material and sale of certain imported articles at reasonable prices to tourists. The Corporations would broadly assess the additional hotel accommodation required to cope with the increasing tourist traffic, arrange for better transport facilities needed for tourists, organise the right type of entertainment and other facilities for tourists and take requisite steps to meet their demands. The Corporations were not being set up as rivals of the Private Sector. It would be their endeavour to supplement the efforts o the private entrepreneurs. Nor was it the intention of Government to put any curbs on the activities of private agencies engaged in similar activities.

In the meeting of State Directors of Tourism in the Western Region held at Bombay in June, 1970 under the Chairmanship of Dr. Sarojini Mahishi, now, Minister of State in the Ministry of Tourism and Civil Aviation, it was suggested that there should be a Tourism Development Authority in each State so that it may be possible to take up the promotion of Tourism and provision of facilities on a commercial basis unhindered by the constraints of Governmental regulations. Government of India has, in addition to a large Directorate of Tourism, several offices in the country as well as abroad, put up by the India Tourist Development Corporation The Rajasthan Government has also done so. At recent meetings of the Western Zonal Tourist Committee as well as the All India Tourist Committee and the All India Tourist Development Council of the Government of India, it was resolved that State Governments should establish a Corporation for the Development of Tourism. Gujarat lacks even a separate Department of Tourism. For the last ten years, the Government of India has been insisting on a separate Department. Work has been carried on with the help of a very small staff and meagre provisions in Five Year Plans. Despite this, holiday homes are now more or less self sufficient. A return on the capital invested has not yet been possible. With the existing funds, the section can neither expand holiday homes as fast as required by tourists, nor can it provide them the facilities they want. At Nals rovar, Sasan and at all holiday camps, there is more traffic than can be provid.d for

Since tourist development has hitherto been run through the Government, it has not been ssible to attract private capital for this purpose. There have been some offers but they could be availed of. Unless private capital is attracted to this field of development, it does not possible to make good progress.

Government of India and Gujarat Government have accepted Tourism as an industry. In f the efforts now been made by Government and the concessions given for the purpose of ial development it is necessary that Tourism also should be taken up as an indust ed on similar lines.

APPENDIX E—*contd.*

It is proposed that Government should put up a Corporation for the development of Toursim on the lines of one of the Industrial Development Corporations. The initial capital for such a Corporation should be Rs. 1.10 crores to be provided by Government. The share capital of the Corporation may be divided into 1.10 lakh shares of Rs. 100 each with the rights, privileges and conditions attached thereto as may be provided by the Articles of the Association of the Corporation. The share capital may be increased in the course of time, when found necessary by the Corporation.

The main objectives of the Corporation would be on the lines of the objectives of the Mysore Tourism Development Corporation, *i. e.*, as under :—

(1) To provide services to tourists and travellers in all forms and particularly the following :—

(*a*) Boarding and lodging facilities ;

(*b*) Conveyance and transport facilities ;

(*c*) Arrangements for excursions and sight seeing trips ;

(*d*) Exhibition of artistic and commercial values ;

(*e*) Exhibition of industrial and cultural attainments ;

(*f*) Library and reading room facilities ;

(*g*) Guide facilities ;

(*h*) Insurance facilities ;

(*i*) Medical facilities ;

(*j*) Recreation in every form and mode including film shows, dramas, music, dances and sport of every kind and description ; and

(*k*) In every other way to satisfy the requirements of tourists and travellers ;

(2) To take over, develop and manage places of tourist interest in the State of Gujarat and elsewhere ;

(3) To promote tourism by all ways and means and to adopt such methods and devices desirable and necessary to attract tourists in large numbers ;

(4) To acquire and take over any of the assets and liabilities of the Department of Information and Tourism of the Government of Gujarat with the object of promoting Tourism ;

(5) To acquire and take over as a going concern all or any of the tourist homes, bungalows, cottages and canteens, etc., holiday homes, picnic spots/places owned and developed by the Government of Gujarat together with all or any of the assets and liabilities attached thereto and to run the same efficiently and economically ;

(6) To carry on business as tourist agents and contractors and for facilitiating travelling to arrange the purchase of tickets in every mode of transport, for reservation of seats and berths, hotel and lodging accommodtion, engagement of guides, insurance of all kinds and to run inquiry bureaus, libraries, reading rooms, etc. ;

APPENDIX E—*concld.*

(7) To carry on the business of hotel keepers, lodging houses and restaurant keepers, licensed victuallers and liquor merchants, chemists and druggists, launderers, hair dressers, agents for road, shipping, railway and air transport, transport operators of all kinds and description;

(8) *To establish art galleries for the exhibition of paintings, engravings, sculptures, jewellery and other works of art ; to buy, sell and deal in works of art of all kinds;*

(9) To establish and administer a Hotel Development Fund and to render financial and other assistance to those who have already started and those intending to establish hotels, motels, travellers' lodges, etc., in tourist centres;

(10) To carry on business as proprietors and publishers of newspapers, journals, magazines, books, *and other literary works, projecting the image of the State of Gujarat* with regard to cultural and industrial potential and tourist attractions; to print and publish road maps, guides, brochures, picture post cards and such other pamphlets and books, slides, video-tapes, casettes, etc., needed by the tourists and travellers; and

(11) To carry on the business of producers, distributors and exhibitors of cine films, documentaries and the like.

In order to implement the major number of schemes provided for, the Corporation *may consider the appointment of committees and take the advice of persons, firms, and institutions in the line, for the development of Tourism.*

APPENDIX F

TOURIST STATISTICS AND EXPECTED TOURIST ARRIVALS IN GUJARAT BY 1974-84

TABLE 1

Arrival of tourists in Gujarat by various modes

(*1*) *Rail*

Sr. No.	Place of tourism	No. of passengers originating by Railway	
		1964-65	1965-66
1	Sasan	44,052	44,847
2	Ahmedabad	1,11,53,374	1,24,43,926
3	Veraval	6,92,037	6,92,092
4	Dwarka	2,83,726	2,88,289
5	Porbandar	3,64,911	3,64,307
6	Palitana	2,05,528	2,02,324
7	Junagadh	11,66,900	11,66,410
8	Virpur	1,68,605	1,64,389

TABLE 2

(2) *Air*

Sr. No.	Place of tourism	No. of passengers originating by Air	
		1969-70	1970-71
1	Ahmedabad	39,347	21,221
2	Bhavnagar	13,374	11,849
4	Jamnagar	10,740	9,373
4	Keshod	2,523	1,722
5	Porbandar	3,862	4,104
6	Rajkot	10,845	10,640

APPENDIX F—*contd.*

TABLE 3

(3) Foreign Visitors

Sr. No.	Year	Number of Foreign visitors registered in Gujarat State	
		Total	Tourists
1	1966	1961	13
2	1967	1613	4
3	1968	2041	33
4	1969	1821	26
5	1970	1610	12
6	1971 (up to 31-8-1971)	2100	..

By the end of the 1970's, world tourist traffic is expected to rise from the present 150 million to over 250 million annually. Faster travel and more space in aircraft are expected to be accompanied by lower fares, and tourism is likely to grow at an unprecedented pace.

At present, Gujarat has 11,69,700 tourists a year, including home tourists.

Increase in the traffic of tourists during Perspective Plan period (1974-84) is expected as under :—

Tourist place	Arrivals in 1970	Expected arrivals in 1974-84
AHMEDABAD DISTRICT		
Lothal	5,000	20,000
Nal Sarovar	60,000	1,20,000
DANGS DISTRICT		
Saputara	29,300	1,00,000
KAIRA DISTRICT		
Lasundra	59,000	1,00,000
Galteshwar	1,99,200	2,75,000
JAMNAGAR DISTRICT		
Dwarka	27,500	[illegible]

APPENDIX F—*concld.*

Tourist place	Arrivals in 1970	Expected arrivals in 1974-84
JUNAGADH DISTRICT		
Chorwad	6,500	20,000
Tulsishyam	3,000	15,000
Porbandar	750	5,000
Sasan Gir	9,450	50,000
PANCHMAHALS DISTRICT		
Pavagadh	8,000	15,000
Kanelao	4,000	10,000
BANASKANTHA DISTRICT		
Balaram	1,20,000	1,80,000
Ambaji	4,69,000	7,25,000
BROACH DISTRICT		
Shuklatirth	1,500	5,000
Kabirwad	10,000	25,000
Malsamot	..	50,000
BHAVNAGAR DISTRICT		
Palitana	10,000	50,000
MEHSANA DISTRICT		
Modhera	1,40,000	1,75,000
BULSAR DISTRICT		
Ubhrat	5,000	10,000
Tithal	500	5,000
Unai	2,000	5,000
SABARKANTHA DISTRICT		
Shamalaji	..	90,000
	11,69,700	22,00,000

Out of total estimates of tourist arrivals by 1984, 20 per cent may be foreigners and 80 per cent home tourists all over the State.

APPENDIX G

SCHEMEWISE OUTLAY PROPOSED FOR TEN YEAR PLAN 1974-1984

For Tourism and Development of Places of Archaeological Importance

(Rs. in lakhs)

	Name of the Scheme	Revenue	Capital	Total
1.	Development of Sasan-Veraval-Porbandar complex. ..	8.00	19.50	27.50
2.	Staff quarters, garages and other facilities alongwith Government of India Tourist Rest House.	1 00	4.00	5.00
3.	Swimming Pool ..	0.25	0.75	1.00
4.	Lion Sanctuary Scheme including Rehabilitation of Maldharis.	10.00	30.00	40.00
5.	Treetop hotel, etc., in Gir forests ..	2.00	3.00	5.00
6.	Development of Ahmedabad Complex and tourist bungalow.	5.00	25.00	30.00
7.	Ropeway and tourist bungalow, etc. at Palitana ..	5.00	25.00	30.00
8.	Dwarka tourist bungalow, canteen, etc.	2.25	5.25	7.50
9.	Improvement of standard of maintenance of Government Guest Houses.	5.00		5 00
10.	Staff quarters, Dormitories, etc., at Modhera, .	0.50	2.50	3.00
11.	Tourist offices at Jaipur, Calcutta, etc. ..	5.00		5.00
12.	Transport facilities	5.00	..	5.00
13.	Foreign publicity	10.00	..	10.00
14.	Hot Springs	5.00	5.00	10.00
15.	Development of Shamalaji	2.00	13 00	15.00
16.	Development of Picnic Spots	3 00	7.00	10.00
17.	Development of Dharamashalas	1 00	1.00	2.00
18.	Ropeways at Girnar, Pavagadh, etc... ..	20.00	20.00	40.00
19.	Launches and mechanised boats for coastal conducted tours. ..	12.00	3.00	15 00
20.	Training of personnel	3.00	..	3.00

APPENDIX G—*concld.*

(Rs. in lakhs)

Name of the Scheme	Revenue	Capital	Total
21. Expansion and modernisation of existing Holiday Homes.	10.00	10.00	20.00
22. Development of new Holiday Homes ..	5.00	15.00	20.00
23. Development of Malsamot in Broach District as Hill Station.	5.00	15.00	20.00
24. Strengthening of the Tourist Section ..	6.00	..	6.00
25. Hotel and Motel projects	4.00	6.00	10.00
26. Establishment of Gujarat Tourist Corporation ..	110.00	..	110.00
27. Development of places of Archaeological Importance.	45.00	..	45.00
Total ..	280.00	220.00	500.00

APPENDIX II

LIST OF IMPORTANT PROTECTED MONUMENTS IN GUJARAT

(GOVERNMENT OF INDIA)

Sr. No. 1	Locality 2	Name of Monument 3
		AHMEDABAD DISTRICT
1	Ahmedabad ..	.. Ahmed Shah's mosque
2	Do. ..	.. Bhadra tower.
3	Do. ..	.. Dada Hari's mosque and tomb
4	Do.	Dada Hari's vav (well)
5	Do.	.. Jami Masjid
6	Do.	.. Rani Rupavati's mosque in Mirzapur
7	Do. ..	.. Rani Sipri's mosque and tomb
8	Do. ..	.. Sayyid Usman's mosque and tomb
9	Do. ..	.. Shah Alam's tomb with all surrounding buildings in the group
10	Do. ..	.. Sidi Said Masjid
11	Do. ..	.. *Sarkhej-no-Rojo* and other monuments nearby
12	Viramgam ..	.. Mansur *Talav* and shrines
13	Lothal ..	.. Ancient site at Lothal, taluka Dhandhuka
		KUTCH DISTRICT
14	Bhuj ..	.. Tomb of Rao Lakha Chatri
15	Kotay ..	.. Siva temple..
		KAIRA DISTRICT
16	Sarnal ..	.. Temple of Galteswara
		GANDHINAGAR DISTRICT
17	Adalaj ..	.. Step well with inscription
		JAMNAGAR DISTRICT
18	Dwarka ..	.. Rukmini temple
19	Gop ..	.. Gop temple
20	Pindara ..	.. Durvasa Rishi's *Ashram* and [illegible]
21	Dwarka ..	.. Dwarkadhish [illegible]

APPENDIX H—*contd.*

Sr. No. 1	Locality 2	Name of Monument 3
		JUNAGADH DISTRICT
22	Junagadh	Ashokan Rock
23	Do.	Caves
24	Porbandar	House where Mahatma Gandhi was born
		PANCHMAHALS DISTRICT
25	Bavka	Ruined temple of Mahadev
26	Champaner	Jami Masjid
27	Do.	Kamanin Masjid
28	Do.	Kevda Masjid
29	Do.	*Lili-Gumbaz-ki*-Masjid
30	Do.	Nagina Masjid
31	Do.	Navlakha Kothar
32	Do.	Palace of Patai Rawal with tanks
33	Do.	*Sat Manzil* between Gate No. 4 and 5 with steps right up to bastion on top.
34	Do.	Shaber-*ki*-Masjid
35	Halol	Panch-Mahuda-*ki*-Masjid
36	Do.	Tomb of Sikandar Shah
37	Kankanpur	Temple of Mahadev
38	Rattanpur	Temple with sculptured screen
		BHAVNAGAR DISTRICT
39	Talaja	Jain temple
40	Do.	Talaja Caves
		MEHSANA DISTRICT
41	Anavada and Samalpati (Patan)	*Sahasralinga Talao*
42	Modhera	Sun temple, Sun tank, *Kund* and Carved Stones with images, temples and underground cell.
43	Patan	Rani *Vav*

APPENDIX II—*contd.*

Sr. No.	Locality	Name of Monument
1	2	3
44	Sidhpur ..	.. Jama Masjid
45	Do. ..	.. Ruins of Rudra *Mahalaya*
46	Vadnagar ..	.. Ajapal *Kund*
47	Do. ..	.. *Torana*
		RAJKOT DISTRICT
48	Dhank ..	.. Dhank Caves
		BARODA DISTRICT
49	Dabhoi ..	.. *Hira Bhagol* with adjoining construction
50	Do. ..	.. Nandodi Gate with the adjoining construction
51	Karavan ..	.. Gateway or *Torana*
		SABARKANTHA DISTRICT
52	Khed ..	.. Group of temples at Khed and Roda (Two temples and Kund together with adjacent land comprised in S. No. 66 of village Khed).
		SURAT DISTRICT
53	Vyara ..	.. Fateh *Burj*
		SURENDRANAGAR DISTRICT
54	Sajakpur ..	.. Navlakha temple
55	Than ..	.. Sun temple
56	Wadhwan ..	.. Ranak Devi's temple

LIST OF IMPORTANT PROTECTED MOUNMENTS

(GOVERNMENT OF GUJARAT)

Sr. No.	Locality	Name of Monument
1	2	3
		AHMEDABAD DISTRICT
1	Dholka ..	.. Khan tank with sluices
		KAIRA DISTRICT
2	Kapadvanj ..	.. *Kund and Toran*

APPENDIX H—*contd.*

Sr. No.	Locality	Name of Monument
1	2	3
		JAMNAGAR DISTRICT
3	Gumali	Group of monuments of Gumali
4	Do.	Group of monuments of Sonkansari
5	Panchhatar	Group of monuments of Pachhatar
6	Jamnagar	Lakhota tower
7	Do.	Bhujiya Kotha
8	Ghumali	Vikiya *Vav*
		JUNAGADH DISTRICT
9	Uparkot	Juma Masjid and Nilam and Kadanala Gun
10	Do.	Adichadi *Vav*
11	Do.	Navaghana *Kuvo*
12	Do.	Bara Sayid with Naz Bibis Makabaro
13	Do.	Mohabat Makabaro
14	Junagadh	Pancheshwar Caves
15	Do.	Narshi Mehta's *Chora*
16	Girnar	Guru Dattatrya
17	Bileshwar	Bileshwar Mahadev temple
18	Prabhas Patan	Rudhreshwar Mahadev temple
19	Do.	Caves
20	Do.	Tank with sluice
21	Gir Forest	Budhhist caves at Mandor
22	Bhansara	Group of temples
23	Porbandar	Shrimati Kasturba's House
24	Madhavpur	Old temple at Madhavpur
25	Balej	Group of temples
26	Odadar	Vishnu temple
27	Sana Hill	Sana caves
28	Delwada	Bhim *Deval*

APPENDIX II—*contd.*

Sr. No.	Locality	Name of Monument
1	2	3
		PANCHMAHALS DISTRICT
29	Kaleshvari	Group of temples
		BANASKANTHA DISTRICT
30	Hadad	Sivapanchayatan temple and *Vav*
		BROACH DISTRICT
31	Zanjpor	Buddhist Caves (Kadia *Dungar*)
		BHAVNAGAR DISTRICT
32	Shihor	Brahm *Kund*
33	Bhavnagar	Ganga *Chhatri*
34	Kalsar	Firangi's temple
		MEHSANA DISTRICT
35	Modhera	*Vav*
36	Akhej	Shakti *Kund*
37	Butapaldi	Temple of Sitalamata
		RAJKOT DSITRICT
38	Supedi	Temples of Supedi
39	Bhadala	*Vav*
40	Khembhalida	Caves
		SABARKANTHA DISTRICT
41	Shamalaji	Harishchandra-*ni-chori*
42	Bhetali	Shivapanchayatan *Mandir* (Temple)
43	Abhapur	Group of temples
44	Atarsuba	Group of temples
45	Matha Sulya	Santbaleshwar Mahadev
46	Khedachandrani	Nagarani *Vav* and *Kund*
47	Idar	*Vav* and *Kund*

APPENDIX H—*concld.*

Sr. No.	Locality	Name of Monument
1	2	3
		SURENDRANAGAR DISTRICT
48	Than ..	.. Taranetar temple
49	Chobari ..	.. Chaumukhi *Vav*
50	Wadhwan ..	.. Madha *Vav*
51	Jhinjuvada ..	.. Gates at Jhinjuvada

Report of the Working Group on Transport and Communications

Part - V

Telecommunications, Railwa
and Civil Aviation

APPENDIX H—*concld.*

Sr. No.	Locality	Name of Monument
1	2	3
		SURENDRANAGAR DISTRICT
48	Than ..	.. Taranetar temple
49	Chobari ..	.. Chaumukhi *Vav*
50	Wadhwan ..	.. Madha *Vav*
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Report of the Working Group on Transport and Communications

Part - V

Telecommunications, Railways and Civil Aviation

APPENDIX II—*concld.*

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Report of the Working Group on Transport and Communications

Part - V

Telecommunications, Railways and Civil Aviation

1.3.2 Linking Ahmedabad with Other Cities in India and Providing STD Services Linking Important Cities in the State with Each Other

1.3.2.1 Ahmedabad has at present, point to point Subscriber Trunk Dialing facilities to Delhi as well as Rajkot. It is also connected by STD to Bombay, Poona and Surat *via* the Trunk Automatic Exchange at Bombay. The installation of the Ahmedabad-Baroda point to point STD has also been completed recently.

1.3.2.2 Ahmedabad has been developing at a very fast rate. In view of its connections with other principal centres of business and commerce in the country, it has become imperative to improve trunk telephone services and to connect Ahmedabad with other cities in the country on STD system as early as possible. At present, Ahmedabad is connected on STD with Delhi, Bombay, Poona, Surat, Rajkot and Baroda.

1.3.2.3 The present availability of circuits betwen Ahmedabad and Delhi is limited because the capacity of the medium (Coaxial Cable) is more or less exhausted. To augument the capacity in regard to high-grade circuits between Delhi-Ahmedabad and Ahmedabad-Bombay, a microwave scheme has been proposed to link Delhi-Ahmedabad-Bombay. This work is in progress and with the installation of this link, a number of stable circuits will be available and it will be possible to connect Ahmedabad to various important cities in India *via* the micro-vave link. It is necessary to expedite this work on a very high priority basis.

1.3.2.4 At present, Ahmedabad is not connected on STD lines with other district head-quarters except Surat, Rajkot and Baroda. It is necessary to provide STD service connecting Ahmedabad with all district headquarters and also to provide such facility for connecting district headquarters with each other.

1.3.2.5 Special mention needs to be made about the requirement of STD facility between Ahmedabad and Gandhinagar. After the shifting of the capital of Gujarat from Ahmedabad to Gandhinagar, the necessity of this service has been greatly felt. Accordingly, direct STD facility between Ahmedabad and Gandhinagar should be provided on a very high priority.

1.3.3 Providing Adequate Telex and Teleprinters Services

For meeting the needs of fast growing industrial and commercial activities, adequate telex and tele-printing services should be provided at important cities in the State.

1.4 Conclusion

An efficient and reliabl: telecommunication facility is ssential for the economic develop-ment of the region. Gujarat is growing industrially and commercially at a very fast rate. To service and accelerat: the tempo of this development, adequate telecommunication system should be provided in advance.

The telephones and postal facilities required for Gujarat Industrial Development Corpora-tion Areas and Estates are shown in Appendix A.

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CHAPTER II

RAILWAYS

2.1 Introduction

As a Central subject, the perspective planning for Railways is formulated by the Government of India on a nationwide basis. However, since the State Government also is vitally interested in the development of transport, including the railway system in the State, it has been making suggestions to the Government of India in the Ministry of Railways, for undertaking new railway lines, as well as for other improvements in railway services.

2.2 Review of the Improvements made in the Earlier Plan Periods

2.2.1 During the First Five Year Plan period, no specific recommendations were made either by the ex-Saurashtra Government or the ex-Kutch State. However, during that period, a section of 32 kms. of a new railway line, connecting gap with Katkola in Jamnagar district and a new railway line between Gandhidham and Deesa, a length of 273 kms. were constructed. During the Second Five Year Plan, the Government of ex-Bombay State (in respect of the Gujarat area only), ex-Saurashtra and ex-Kutch made recommendations for the construction of a total of 25 new lines. Out of these, not a single line could be undertaken by the Railways. During the Third Five Year Plan, recommendations were made for 20 lines but only the Himatnagar-Udepur Railway line was taken up for construction. Of this line, 35 kms. are within Gujarat State, the remaining being in Rajasthan. Another line, viz., Kandla-Zund broad gauge line of 232 kms. in length was included by the Government of India. This line has since been completed and commissioned for traffic. During the Fourth Plan, recommendations were made by the State Government for 22 new lines as under, in different orders of priority, viz., Category A, which included lines of vital importance to the State and, therefore, strongly recommended to Government of India, Category B, which included lines of importance having second priority, and Category C, which included lines having a lower priority.

Category 'A'

		Kilometres
1	Ahmedabad-Gandhinagar-both Broad Gauge and Metre Gauge links	17.5
2	Rajkot-Jasdan Metre Gauge	60.0
3	Bhavnagar-Tarapur Broad Gauge	127.0
4	Ankleshwar-Rajpipla. (Conversion to Broad Gauge of the existing Narrow Gauge and its extension to Gora, the site of Narmada Project.)	63.0

Category 'B'

1.	Udhna-Magdalla Broad Gauge	7.0
2.	Ahmedabad Circular Railway	45.0
3.	From the station of New Kandla Zund railway line to Jamnagar-Sikka and Okha Broad Gauge *or* Viramgam-Rajkot-Jamnagar Broad Gauge	207.0 264.0
4.	Harij-Radhanpur Broad Gauge	33.4
5.	Mahuva-Talaja-Bhavnagar Metre Gauge	100.0
6.	Rajula-Jafrabad Metre Gauge	25.0
7.	Bilimora-Waghai (Conversion into Broad Gauge.)	63.0

line cannot cope with the traffic that will develop during the course of construction as well as after the construction of the project and the present bottleneck of transhipment from broad gauge to narrow gauge will prove to be a serious handicap. Accordingly, the conversion of this line from narrow gauge to broad gauge is very important.

2.3.2.6 *Conversion of Ahmedabad-Delhi Metre Gauge Section into Broad Gauge.*—The traffic between Ahmedabad and Delhi is increasing at a fast rate. The major port of Kandla is also providing a large volume of traffic for this line. Considering the traffic requirements as well as the policy of Government of India, to provide fast *Rajdhani* Express trains connecting State Capitals with Delhi, the conversion of this line from metre gauge to broad gauge is necessary.

2.3.2.7 *Udhna-Magdalla Broad Gauge Line.*—The port of Magdalla (Surat) has been developed on the river Tapti. This is a lighterage port. There is no other such port between Umergaon and Cambay on the west coast of Gujarat. The port is very favourably located in relation to its hinterland, *viz.*, the area served by the existing Tapti Valley line and to Surat-Baroda-Godhra section. For this area, the port of Magdalla is a natural and economical outlet. However, as it is not provided with a railway connection, it cannot be utilised fully. Accordingly, it is essential to provide a broad gauge connection between Udhna and Magdalla, a distance of 9 kms.

2.3.2.8 *Conversion of important Narrow Gauge Sections into Broad Gauge Sections.*—In Gujarat, there is a large kilometreage of narrow gauge lines as under :—

(1) Chhota Udepur-Jambusar.
(2) Chhuchhapura-Tankhala.
(3) Dabhoi-Timba Road.
(4) Chandod-Dabhoi Miyagam-Malsar.
(5) Choranda-Motikoral.
(6) Broach Jambusar-Kavi.
(7) Samni-Dahej.
(8) Nadiad-Kapadvanj.
(9) Nadiad-Pij-Bhadran.
(10) Godhra-Lunavada.
(11) Champaner-Pani Mines.
(12) Ankleshwar-Rajpipla.
(13) Jhagadia-Netrang.
(14) Kosamba-Umarpada.
(15) Bhavnagar-Mahuva.
(16) Joravarnagar-Sayla.
(17) Morvi-Tankara.
(18) Morvi-Ghantila.
19) Piplod-Devgadhbaria.
(20) Billimora-Waghai.

These lines were constructed during the pre-independence period. Due to various difficult es such as transhipment bottlenecks, poor track maintenance, low capacity engines and rolling stock, unsuitable train timings, long journey times, etc., these lines are not being fully utilised and have become unremunerative. The Government of India, therefore, appointed 'Uneconomic Branch Lines Committee, 1969' under the Chairmanship of Shri Rohanlal Chaturvedi, the then Deputy Minister for Railways. This Committee has gone into the details of all the branch lines in the country and has made important recommendations. These recommendations should be followed up by the Government of India and the narrow gauge lines in Gujarat State converted into broad gauge lines in a phased programme.

2.3.2.9 *Rajkot-Jasdan Metre Gauge Line.*—During the Fourth Plan, Railways had undertaken a survey of this line. If constructed, it will shorten the distance between Rajkot-Bhavnagar and will serve important centres such as Sardhar-Jasdan etc.

2.4 Conclusion

The lines recommended are important and will help in furthering the economic growth of Gujarat. They should generate sufficient traffic to make them economically viable. Apart from these, Gujarat must keep pressing the Railway Board for adequate Marshalling Yards to cope with the increasing traffic.

CHAPTER III

CIVIL AVIATION

3.1 Introduction

As Civil Aviation is a Central subject, the Perspective Planning for airports within Gujarat and of the air services to and from these airports will have to be done by the Government of India in the Civil Aviation Department as also by Indian Airlines. However, as the Government of Gujarat is also interested in the development of Transport and Communications, including air services within the State, the following suggestions are made about the development and improvement of airports and air services within Gujarat.

3.2 Present Position

There are at present nine airports in Gujarat.

Major Airport-Ahmedabad

3.2.1 Ahmedabad, which is an international alternate to Bombay, is suitable for occasional use by aircrafts of the Boeing 707 type. It has two runways. The main runway was extended in 1966-67 to 2,286 × 46 metres (7,500 feet × 150 feet). Its load classification number (LCN) is 60. It is suitable for regular use by the Caravelle and Boeing 737 aircraft in the Indian Airlines fleet as also for occasional use by Boeing 707 aircraft.

Other Airports

3.2.2 Apart from this major airport, there are intermediate airports at Baroda, Bhavnagar, Bhuj, Kandla, Keshod, Porbandar and Rajkot. The airport at Jamnagar is under the Indian Air Force.

Airstrips

3.2.3 The following airstrips, suitable at present for emergency use by small aircraft, belong to the Government of Gujarat :—

Amreli	.. Amreli District	Morvi	Rajkot District
Dhrangadhra	.. Surendranagar District	Parsoli	Bulsar District
Surat	. Surat District	Radhanpur	Banaskantha District
Khavda	.. Kutch District	Rajpipla	Broach District
Limbdi	.. Surendranagar District	Wadhwan	. Surendranagar District
Mehsana	.. Mehsana District	Wankaner	.. Rajkot District

These disused airstrips are in various stages of repair. In addition, there is an airstrip belonging to Tata Chemicals at Mithapur.

3.2.4 At Appendix B is a list of the nine airports maintained by the Civil Aviation Department of the Government of India. The list gives the dimensions of the runways, their LCN, the type of pavement and the elevation in metres above sea level. With these runway

dimensions and load bearing strengths, only turbo prop aircraft can operate at present through the airports at Baroda, Bhavnagar, Bhuj, Kandla and Rajkot, while Keshod and Porbandar are not at present suitable even for turbo props.

Recommendations

3.3 Modernisation and Rationalisation of the Existing Airports and Improvement of Air Services in Gujarat

3.3.1.1 Since Indian Airlines is phasing out its Dakota aircraft in the course of the next year or so, the marginal airports in Gujarat such as Keshod or its alternate, Veraval, will have to be brought up at least to turbo prop standard on an immediate basis. So far as the Perspective Plan is concerned, all the airports in Gujarat will have to be upgraded to take Jets because even the HS 748 aircraft, at present in the Indian Airlines fleet, will be phased out by the mid-1980's. The lengthening and strengthening of all the runways will have to be undertaken during the latter part of this decade and early in the next decade by the Director General of Civil Aviation under the Ministry of Tourism and Civil Aviation. A minimum length of 1830 meters (6,000 ft.) and strength of 45 LCN is recommended. So far as the State Government is concerned, it should prevent the construction of buildings except of the permitted height in the funnel area at either end of the runway and stop the conversion from agricultural to non-agricultural use of land for some distance at either end of the runways. Otherwise these airports will not be able to take Jets in the next decade, when the need arises. THESE MEASURES MUST BE TAKEN IMMEDIATELY, as also care about the siting of slaughter houses and refuse dumps in the vicinity of all airports and airstrips to lessen bird hazard to aircraft.

3.3.1.2 The route-wise Revenue Load Factors on the Indian Airlines' services relating to Gujarat are reproduced in the table below :—

Appendix C contains information about the traffic carried on various air routes passing through Gujarat and about the number of passengers originating from the airports of Gujarat.

TABLE

Route	Operated by	Revenue Load Factor per cent		
		January 1970	February 1970	February 1969
Bombay-Ahmedabad-Udaipur-Jaipur-Agra-Delhi.	48 seater Viscount	73.7	79.3	84.6
Bombay-Keshod-Porbandar ..	21 seater DC-3	97.1	99.2	72.3
Bombay-Bhavnagar-Rajkot-Bhuj ..	44 seater HS-748	63.2	65.8	64.3
Bombay-Baroda-Ahmedabad	do.	76.4	77.5	61.9
Bombay-Bhavnagar	do.	68.9	73.7	69.4
Bombay-Jamnagar-Kandla-Bhuj ..	do.	63.5	68.2	63.2
Bombay-Ahmedabad	48 seater Viscount	70.8	75.7	..

It will be seen that the Load Factors have been consistently above 60 per cent in the case of all the services. Additional equipment has been introduced on some of these services and a Jet service with a Caravelle now operates on the Bombay-Ahmedabad-Delhi sectors. From October 1971, an additional Caravelle service has been introduced between Bombay and Ahmedabad and the Bombay-Bhavnagar-Rajkot HS-748 service has been linked with Ahmedabad. Inspite of all this, Load Factors continue to be high. It is an accepted principle in

that when Load Factors are consistently above 60 per cent (or at the mo 65 per cent) additional frequencies or aircraft are added. In the light of this, the Grou has attempted to determine what the position will be towards the end of the Perspective Pla period. Even at the very conservative Growth Rate of 15 per cent per annum compound, a the end of the 14 years period 1970-84, the traffic demand will be such as to fully justify the replacement of almost all the present services by those operating much larger capacity aircraft, because the 89 seat Caravelle, the 48 seat Viscount, the 44 seat HS-748 and the 21 seat DC-3, which are already running nearly full, will then be totally inadequate.

3.3.2 It is on the basis of these projections that the Air Map of Gujarat about the likely position in the mid-1980's has been prepared. At this point of time, it is of course not possible to work out in detail the frequencies and the exact type of equipment that will be required, but it is clear that on the Bombay-Ahmedabad-Delhi run, served at present by 89-seat Jet aircraft, the requirement in the mid-1980's will be for the largest aircraft in the Indian Airlines fleet, *i. e.*, an aircraft with a capacity between 200-350 seats.

3.3.3 As regards other routes, aprat from the capacity requirement, there are other considerations. By the mid-1980's with the mere passage of time, the Indian Airlines fleet is likely to consist of Jet aircraft. DC-3s already overdue for replacement, would have been phased out in 1972-73. The last of the Viscounts would have gone by 1975. Caravelles the first purchased in 1963 and the last in 1967, would also have been phased out by 1980. As regards HS-748s, the first of which was purchased in 1967 and the last of which is expected to be received in 1973/1974, they too would be on their way out. It appears to the Group that they may not be operating in Gujarat by the mid-1980's considering also the need for bigger and faster aircraft in this region.

3.3.4 Gujarat must, therefore, prepare for all this in time and keep pressing the Central Government to convert the airports at present using turbo prop aircraft for use by Jet aircraft. Some rationalisation may also be necessary if Indian Airlines is not able to operate to all the airports in the 1980's.

3.3.5 On the above basis and taking the likely demand into consideration, the following routes would justify the operation of Jet services with aircraft seating over 100 passengers in the latter half of the Perspective Plan period :—

Bombay-Surat-Baroda-Ahmedabad.
Bombay-Bhavnagar-Rajkot-Bhuj.
Bombay-Veraval (Keshod)-Porbandar-Jamnagar-Rajkot-Ahmedabad.

3.3.6 As regards STOL† services, links will be necessary to District Headquarters as well as places of tourist interest in Gujarat. The desirable network of STOL services is indicated in the map and is set out below. It is felt that in the 1980's these will be needed despite the availability of Express Coach Services :—

Ahmedabad-Baroda-Broach-Surat-Bulsar-Daman (Helicopter Extension to Ahwa-Dangs)
Ahmedabad-Godhra.
Ahmedabad-Mehsana-Palanpur-Himatnagar-Ahmedabad.
Ahmedabad-Surendranagar-Amreli-Bhavnagar-Ahmedabad.
Rajkot-Dwarka-Porbandar-Veraval-Sasan-Rajkot.

3.3.7 On the basis of studies by the Gujarat State Road Transport Corporation and the Directorate of Transport on the growth of the Luxury Bus and Tourist Taxi traffic, another air route may develop outside the State linking Ahmedabad by a Jet service with Indore. The services beyond Indore could be to Bhopal, Khajuraho and the industrial and tourist cities of Uttar Pradesh. As regards connections with Rajasthan, it is possible that direct tourist and other traffic may develop between Veraval (Keshod)-Rajkot and Jodhpur-Udaipur. Even if this does

† Services operated by aircraft capable of Taking Off and Landing from short runways.

not happen, it is certain that the Ahmedabad-Udaipur-Jodhpur-Jaipur services, at present served by 48 seat Viscounts will require jet aircraft with a capacity of over 100 seats, specially for tourists by the mid-1980's. Please see also the Report on Tourism.

3.3.8.1 The next question is which organisation will operate the STOL services. Several courses are open. The first is that, in view of its tourist potential, Indian Airlines may itself set up a subsidiary company to run STOL Taxi services. They have already been examining this with the Director General of Tourism. Though no results have been achieved up to now, later in the decade or early in the 1980s, the Airlines may well venture into this field. If they do not, the next course open is for these services to be run by private companies. For this, a policy decision at Government of India level will be necessary not only because it will mean the import of aircraft by these private companies but because the main issue will have to be decided as to whether such scheduled or non-scheduled services are to be allowed to be run by private operators. So far, they have been permitted to do this with aircraft no longer required by Indian Airlines. As suitable aircraft for STOL services will not be available with the Airlines, this main decision will have to be taken during the current decade.

3.3.8.2 The third course and the one that is most likely to succeed is for the State Government itself or for one of its corporations such as the Gujarat Agro-Industries Corporation to enter this field. This, it can do, specially if versatile STOL aircraft are imported. These aircraft can then be used during the crop spraying/dusting season to get rid of infestation to which high yielding varieties of cotton and other crops are particularly susceptible. The aircraft is required for this purpose for a short time during the year. At other times, it will be available to the State Government for running STOL services for the administration and for foreign tourists as well as to serve as a stand-by for calamities such as floods, earthquakes, etc. In the past, helicopters have had to be borrowed from the Indian Air Force during floods and earthquakes. Versatile aircraft, suitable for spraying/dusting and passenger operation are now available, the cost for a 10 seater aircraft being in the region of Rs. 9 lakhs. Government of India plan to allow the import of as many as 80 aircraft for aerial plant protection work. It is understood that one of the Corporations under the Government of Punjab plans to import six helicopters and three fixed wing aircraft for plant protection and other purposes. A study should be entrusted by the Gujarat Government or a Corporation such as GAIC to a body such as the Indian Institute of Management at Ahmedabad on the Cost/Benefit aspects of such an investment. Even these aircraft will need airstrips, etc., and this infrasturcture must be planned from now, *i. e.*, airstrips, some air traffic control, telecommunications, etc.

In case versatile aircraft are not considered suitable for passenger service, other STOL aircraft at a cost of Rs. 15 to 30 lakhs each will need to be imported.

3.4 Manpower

As regards manpower, the requirement of the very small number of Pilots,Engineers and the ground staff for running a fleet of six to eight STOL aircraft should present no difficulty. A sufficient number of Pilots trained at the existing Flying Schools and with Commercial Pilots Licenses are even now available, so are Engineers and other ground personnel. The Director General of Civil Aviation will have to expand his Department so as to be able to provide the Air Traffic Control and Navigational as well as Landing Aid personnel required for these services so as to make the STOL service operation efficient and safe. For this, the Group recommends that action should be taken by DGCA from now.

3.5 Telecommunications and Meterological Services

An important portion of the infrastructure is the telephone facilities to the airstrips. There need be no particular difficulty about this as the strips are proposed to be put up at District Headquarters but Direct Dialling to the airstrips should be planned from now. Desirably, it should be reinforced by Wireless Communication/Telex so that STOL services may ultimately operate as commercial propositions providing safe, efficient and comfortable air transportation, particularly for foreign tourists. Meteorological services will also have to be

...ed not only for STOL services but also for the Major Airlines network in Gujarat [in] the coming decade.

3.6 Resources

3.6.1 The expenditure on the Major and Intermediate Airports in Gujarat, the supporting facilities at these airports and the capital and running cost of the commercial air services will have to be borne, as hitherto, by the Government of India in the Civil Aviation Department as well as by Indian Airlines. The Group's recommendations are to cover expenditure for airstrips and for a fleet of STOL aircraft. The latter expenditure could be by way of investment in a State public sector (say, the Gujarat Agro-Industries Corporation) or a joint sector Corporation for running air services within the State. Although the expenditure proposed is modest, Rupees 5 crores during the Perspective Plan period, it may be asked whether any resources will be generated, particularly by the State Government running STOL services. The Group suggests that nearer the time Cost / Benefit studies should be undertaken. Many of the benefits to be derived from Civil Aviation are of such nature as to be difficult to quantify. These benefits are well brought out by Dr. Nandini U. Joshi of the Indian Institute of Management in her hitherto unpublished Report ' Importance of Civil Air Transport to the Indian Economy '. Dr. Joshi has done this work for Indian Airlines on the lines of similar studies undertaken in Britain, Australia and some other countries as advised by the International Air Transport Association, Geneva. Dr. Joshi's Report, as that of Stephen Wheatcroft, when published, may be read with these Recommendations. In the meanwhile, the following benefits which have been examined in detail by Dr. Joshi must be mentioned :—

(*i*) The employment generated by Civil Air Transport and related industries in the economy of India.*

(*ii*) Foreign exchange through running Civil Air Transport Services in India.*

(*iii*) The trade advantages of these services

(*iv*) The stimulus to communications and commerce within India.*

(*v*) The technological ' spin-off ' of Civil Air Transport in India.*

(*vi*) Unquantifiable advantages

Unquantifiable Advantages of Civil Air Transport to Indian Economy

On unquantifiable advantages, Dr. Joshi has this to say :—

The full impact of civil air transport to the Indian economy cannot be measured quantitatively. Many of the benefits of civil aviation are significant and obvious, but are integrated with the process of development and, therefore, difficult to specify. However, they are certainly worthy of mention.

The system of airlines places the country in a much sounder strategic position and consequently creates a stimulating climate for business.

Besides, civil air transport has created opportunities for growth of industries in many cities, Poona or Baroda for example, which might have otherwise lacked incentive or impetus to expand. Civil aviation has also created demand for new products and services.

But for Indian Airlines, it would be difficult to carry out business and other communications with remote parts of India. This is especially true for the far-eastern part of the

* The figures, etc., for Gujarat are not available at present. The Group recommends that a study should be undertaken to obtain these and that, in future, the State's Bureau of Economics and Statistics should maintain these statistics on a regular basis.

the city. There is, therefore, considerable potential for the developmen
air traffic. This is confirmed by the Indian Airlines traffic survey carried out some t
ago.

3.7.2.3 At present, there is a 610 metres (2,000 feet) airstrip constructed by the Sta
Government to encourage Flying Club activities. Sufficient land and other facilities such as a
approach road/power/water/telephone connections/transport/are available. The lengthenin
and strengthening of the runway and the provision of Air Traffic Control for the operation
of turbo-prop, and later, of jet aircraft need to be taken up quickly.

3.7.2.4 There is need for providing air services to the Vapi Industrial Area An adequate runway is available at Daman, only 11 kilometres from Vapi. An air link can be provided between Bombay and Daman to serve the large number of industrialists who have their units in Vapi requiring frequent visits from Bombay.

3.7.3 Improvement of State Owned Airstrips and Providing New Airstrips

While the capital and revenue expenditure on all the items mentioned above will have to be planned for by the Department of Civil Aviation under Government of India and the services run by Indian Airlines, the Group is of the view that the State Government shoud now step boldly into the field of Civil Aviation on a modest scale during the period 1974-84. The exact mode of participation may be determined in due course but the infrastructure such as the airstrips and approach roads, power / water / telephone connections should be planned and provided by the State Government. It must not be forgotten that some out of the nine airports at present used by Indian Airlines for its turbo-prop and piston-engined aircraft commercial services have developed from rudimentary airstrips put down some 30 to 40 years ago by the rulers of erstwhile States or by earlier administrations. It is because these investments were first made that Indian Airlines is able to provide fast and comfortable air services throughout Gujarat. We can expect an improvement in the Gujarat air routes network *only* if the State Government invests modest amounts in airstrips, etc., which should be provided by 1984 (*a*) at all District Headquarters, (*b*) at or near places which are of special tourist importance and (*c*) near the sites of important projects such as Narmada, Ukai, the Aluminium Smelter, the Nuclear Power Plant and so on. Small aircraft carrying between 10 to 20 passengers and with very good airport performance requiring airstrips not more than 920 metres (3000 ft.) are now available. These STOL aircraft cost between Rs. 15 and Rs. 30 lakhs each. A small fleet of these could be purchased by the State Government or by a subsidiary of Indian Airlines to provide air taxi services, specially for tourists. If the State Government or Indian Airlines are both not interested, private parties could be encouraged to run these services. The procedure is that in case the national carrier, Indian Airlines, has no objection, permission is given by the Director General of Civil Aviation for the operation of scheduled or non-scheduled passenger and freight services on sectors which Indian Airlines does not operate. The Director General of Tourism had earlier examined a scheme under which STOL air taxis could be operated from Ahmedabad to Abu Road for the hill station at Mount Abu, Mehsana for the Sun Temple at Modhera and Bhavnagar for the Palitana Temples. There is need for air taxi services between Rajkot and the Gir Lions sanctuary also. The distances between the different places of tourist interest between which STOL services can be operated are shown in Appendix D. These services should be in addition to the services which will be required to connect Ahmedabad-Gandhinagar with District Headquarters. All this can be done by providing suitable airstrips about 1372 metres (4,500 ft.) long and 31 metres (100ft.) wide with black top surface and a suitable base, depending on the soil conditions and the load bearing strength of the sub-grade. Such airstrips and connected facilities can be provided by the State Public Works Department at a cost between Rs. 15 and Rs. 20 lakhs each, depending upon whether the location is in North or South Gujarat or Surashtra / Kutch. The total cost for the dozen District Headquarters not at present connected by air could be in the region of Rs. 2.5 crores during the Perspective Plan period. The expenditure could be equally divided between the Fifth and Sixth Plans. Ambulance crash fire tenders will have to be hired during the arrival and departure time from local Municipal authorities. Shelters for passengers will have to be built and maintained. Air Traffic Control for this network of STOL services will be in the hands of the Director General

He will have to be approached in time so that he can make adequate provisions in the Fifth and Sixth Plans. The line maintenance for STOL aircraft can be provided either by private operators or by Indian Airlines or its subsidiary or by a Corporation such as the Gujarat Agro-Industries Corporation. The Group is convinced that if a beginning like this is made by Gujarat, it will pay rich dividends by providing rapid communications so important for the growth of industry as well as for the administrative, political and psychological integration of the State, apart from providing a very valuable service to tourists who bring Foreign Exchange. At Appendix E is a note on the Importance of Airports and Civil Air Transport.

3.7.4 Providing Airstrips at all District Headquarters

At present, the following District Headquarters are served by air services as shown in the Map :—

Ahmedabad	Rajkot
Bhuj	Bhavnagar
Jamnagar	Baroda

This leaves the following District Headquarters to be connected by air. :—

Junagadh	Godhra	Palanpur
Broach	Mehsana	Bulsar
Himatnagar	Surat	Surendranagar
Kaira	Ahwa	Amreli

Please see para 3.7.3 above for an estimate of the costs involved to provide these places with airstrips and connected facilities.

3.8 Indian Airlines Services to Neighbouring States

During the next 5 to 10 years, Indian Airlines will have to be pressed to connect some of the airports in Gujarat with airports in the neighbouring States, *i. e.*, Rajasthan, Madhya Pradesh and Maharashtra. At present, there are no direct services from Ahmedabad-Baroda to places such as Indore, Bhopal and the airports of Uttar Pradesh or to airports in Maharashtra such as Nasik and Aurangabad. Similarly, the Saurashtra tourist airports such as those serving Sasan-Gir, Palitana, etc., are not connected with the tourist airports of Rajasthan such as Udaipur, Jodhpur, Jaipur, etc. For a note based on a study made by the Gujarat State Road Transport Corporation and by the Director of Transport on long distance road transport services and tourist taxis, please see Appendix F and its accompanying Statement as well as the Map.

3.9 Appointment of an Aviation Adviser to the Government of Gujarat

In Maharashtra, Punjab and West Bengal, Aviation Advisers have been appointed by the State Governments (in some cases, on an Honorary basis) so that the development of air fields and air services and the organising of Flying and Gliding Clubs in the State can be properly co-ordinated and liaison established with the Government of India in the Civil Aviation Department. The Adviser can help in conducting of traffic surveys, the location of airstrips and the planning of the infrastructure. Considering the number of its airports and its geographical situation, an Adviser will be particularly useful in Gujarat. Indeed, he should be appointed during the Fourth Plan period. In emergencies such as floods, earthquakes, or during a period of hostilities, his services can be of even greater value.

3.10 Agro Aviation for Plant Protection

A massive plant protection programme is envisaged by the Ministry of Agriculture for crop dusting and plant protection. While this is covered by the Agriculture Group, a reference by this Group is necessary here to point to the need for (*a*) training of sufficient young men in agro

aviation and (b) for providing airstrips at least at District Headquarters, from where agro aviation operation in each District can be conducted in the future.

3.11 Training in Flying and Gliding

3.1.1 At present, there is only one Flying Club in Gujarat, the Gujarat Flying Club with its Headquarters at Baroda and a Branch at Surat. There is one Gliding Club at Ahmedabad. Apart from the value of flying as a youth activity and a form of sport, these clubs provide training facilities for commercial pilots and help in making the youth of Gujarat air minded. The defence aspects of this activity need no emphasis. Because of increased costs, the Clubs are operating at a loss and have been asking for financial assistance from the State. The State Government gives a Flying Subvention at the rate of Rs. 49.50 per flying hour. It is desirable not only to continue this assistance but to increase it so that a larger number of young persons is attracted. The Gujarat Flying Club is in financial difficulties and requires to be helped immediately. On Gliding Club in the Saurashtra region ought to be set up with financial assistance from the State Government.

3.12 Conclusion

With its great potential in the field of economic development, especially during the late seventies and early eighties when Gujarat will be ready for even further growth because of the benefits resulting from the setting up of a good road network, the beginning of the multi-purpose Narmada scheme, plentiful power (a good portion of it from nuclear plants), improved production in agriculture and industry and the probable discoveries of additional gas and oil fields, air services in Gujarat will become even more important. Gujarat must take the fullest advantage of the latest developments in all fields by creating the airroute network that this Group has recommended and invest in providing airstrips at those places where they do not exist at present because such strips will eventually bring regular commercial air services to more airports in Gujarat, linking it with other airports in the country and with the world. They will attract foreign tourists as well as new industry and become places of employment and a source of revenue apart from providing the means for instruction in flying to those who want to take to this important field of transportation Our country has less than 70 airports. What we need is a something like an Airports and Airways Development enactment which will enable the expansion of the capacity of our airports and our airways system. This should cover Gujarat and other States and provide funds for airport planning, allowing greater consideration and study on the placement of airports, improved service and transportation as well as adequate airport support facilities. There ought to be a scheme under which the Government of India would spend the major portion of the money required, the rest to be made available to regional planning agencies for Statewise airport planning. There also ought to be a scheme under which if a State provides minimal airport facilities such as those recommended in this Report, the other costly supports such as Navigational and Landing Aids are provided by the Government of India. While Gujarat should keep pressing the Government of India for such emphasis and expenditure on the improvement of the air transportation system within the State, it should be ready to invest up to Rs. 5 crores in the ten years between 1974 and 1984 on an improved air transport system. It will be an investment which will pay rich dividends.

(Rs. in crores)

A. Outlay on airstrips @ Rs. 15—Rs. 20 lakhs each complete with fencing, approach road, power / water / telephone connections, chowkidar's hut, fuel installation, airport office-cum-passenger rooms etc. .. ..

B Outlay on STOL aircraft @ Rs. 15 to 30 lakhs each for air taxi and other such operations. .. .. 2·

Total for Fifth and Sixth Plans .. .. ..

Expenditure in each Plan period .. ..

APPENDIX A

(Para 1.4)

TELEPHONES AND POSTAL FACILITIES REQUIRED FOR GUJARAT INDUSTRIAL DEVELOPMENT CORPORATION AREAS/ESTATES

A. Telephone Facilities

(1) Post and Telegraph Department assess the requirement of new lines on the basis of applications received. Establishment and development of an Industrial Estate takes about a year and a half. The allotment and occupation takes another two years. Post and Telegraph Department should plan for the expansion of the existing capacity or for creating new capacity on the basis of the potentiality of the area, size of the estate being developed by GIDC and expected demand. Statement I shows the additional requirements of telephones during the Fifth and Sixth Plans for the different regions of the State. GIDC will place at the disposal of Post and Telegraph Department al data necessary for this purpose. The present practice of assessing the demand on the basis of the applications received creates a serious backlog and hampers industrial growth.

(2) Wherever it is not possible to give adequate number of new connections, Post and Telegraph Department should agree to provide at least a PCO and a connection in the GIDC office on top priority basis. GIDC has already made a request for such facilities at the Petro-Chemical Complex (PCC), Nandesari, Makarpura, Vapi, Bulsar, Vatwa, Cambay and Mehsana.

(3) In other areas, where the capacity is available in the existing exchanges, new connections are not released because of the shortage of cables and other stores. Expansion programmes are also held up for want of requisite stores. It is necessary that the cables and stores are supplied promptly for releasing new connections and for the expansion of existing exchanges catering to the needs of GIDC areas.

(4) The specific problems of major estates are as under :—

(*a*) *Petro-Chemical Complex.*—The ultimate requirement of the PCC near Baroda would be 1,000 lines. At present, a small 300 line exchange is working near Koyali Refinery. The capacity of this exchange is fully utilised. The Post and Telegraph Department has a proposal to set up a new exchange with 1,000 lines in the northern township of the Refinery. This will take quite some time. In the meanwhile, the Post Master General has a proposal for setting up a MAX-2 type exchange at Nandesari with 300 lines which will be inter-linked with Baroda. It is necessary to implement this quickly. At present, no unit in Nandesari sector has been able to obtain a teplephone connection.

(*b*) *Makarpura.*—The ultimate demand of this area would be about 1,000 lines. Post Master General's proposal for setting up a separate Manually Operated Exchange with 200 lines in this area needs early implementation.

(*c*) *Vapi.*—The proposal to set up a new satellite Manually Operated Exchange in industrial area needs to be implemented quickly. This new exchange would be linked with the existing exchange in Vapi town. For this, the existing Boards of Vapi Exchange require to be replaced. Out of the 7 Boards required, 4 have been received and 3 are expected shortly. It is necessary to expedite the supply of Boards and approval for setting up a new exchange in the Industrial Area.

(*d*) *Ahmedabad.*—The proposal to set up MAX-2 type exchanges with 600 lines each at Vatwa and Odhav has been approved. GIDC has provided built-up sheds with suitable additions and alterations for housing these exchanges. The commissioning of these two exchanges needs to be expedited.

B. Postal Facilities

(1) Post and Telegraph Department considers the opening of new Sub-Post Offices on the basis of expected revenue of about of Rs. 12,000 per annum. For assessing the expected revenue and work load, the method adopted is to find out the number of letters received in the Post Offices catering to that particular area. In most of the industrial areas, where postal facilities are not available in the industrial areas themselves, the industrialists like to collect their mails at their residential addresses or when they have registered offices in the nearby main city, at such registered offices. Because of this, existing work load in the post office serving an industrial area is inadequate. GIDC has found that the average minimum receipt and despatch of letters per factory is about 10. If there are 50 small or big factories in operation in an estate a Sub-Post Office would be able to earn the revenue of Rs. 12,000 per annum as per standards adopted by the Post and Telegraph Department. Post and Telegraph Department should therefore agree to open a Sub-Post Office in an industrial estate where 25 factories are already working and another 25 factories are likely to come up within one year

(2) GIDC has submitted proposals to open Sub-Post Offices in the Nandesari, Bulsar, Vapi, Pancesara, Katargam, Nadiad, Cambay, Chitra, Aji, Jamnagar, Godhra, Kalol, Gandhidham, Vatwa and Odhav Estates * Statement II shows the details about the factory sheds constructed or under construction and number of existing factories and the new factories expected to come-up where opening of Sub-Post offices with telegraph facilities would be essential. If Post and Telegraph Department agrees to open Sub-Post Offices in these Estates it can be reasonably assured of adequate revenues to maintain these Post Offices

(3) GIDC is inclined to consider the question of giving the guarantee against revenue loss The existing method is to calculate the expected revenue or loss on the basis of expected work load. Post and Telegraph Department then insists on deposit of an amount equivalent to the expected loss which would be considered as non-refundable contribution. This means that when at the end of a year even if no loss is actually reported, the Post and Telegraph Department would not refund the amount paid initially The Post and Telegraph Department should agree to open Post Offices on the basis of the re-imbursement of actual loss at the end of the year.

(4) GIDC is prepared to provide built-up accommodation required by Post and Telegraph Department for housing Sub-Post Offices. Such accommodation can be provided on reasonable rent or on hire purchase basis. The Corporation has already constructed new Sub-Post Office buildings at Vapi, Naroda and Umbargaon.

STATEMENT I

(With Appendix A)

Additional requirements of Telephones for the Fifth and Sixth Plan Periods

Sr. No.	Name of area	Telephones required		
		Engineering Industry	Petrochemicals, Chemical and Non-Engineering Industry	Total
1	2	3	4	5
	Fifth Plan			
1	Ahmedabad Area	457	187	644
2	Baroda Area	290	748	1,038
3	South Gujarat Area	350	285	635
4	Saurashtra Area	470	308	778
	Total for the State of Gujarat ..	1,567	1,528	3,095 †
	Sixth Plan			
1	Ahmedabad Area	553	216	769
2	Baroda Area	450	1,087	1,537
3	South Gujarat Area	549	350	899
4	Saurashtra Area	531	349	880
	Total for the State of Gujarat ..	2,083	2,002	4,085 †

† Telephone requirements for Small Industries will be in addition to these figures.

Fifth Plan : 23,000 Numbers Sixth Plan : 32,000 Numbers.

(It is not possible to indicate the regional distribution as Small Industries may be established anywhere in the State).

STATEMENT II

(With Appendix A)

List of GIDC Areas/Estates where opening of Sub-Post Offices with Telegraph facilities is essential

Sr. No	Name of area/estate	Name of the nearest village or town and distance in km. from where the estate is served at present	Number of factory sheds constructed or under construction	Number of existing factories	Number of new factories likely to go into operation during 1972-73
1	2	3	4	5	6
	Ahmedabad				
1	Odhav ..	.. Odhav 1	106	83	33 to 60
2	Vatwa ..	.. Vatwa-4	77	27	40 to 50
	Baroda				
3	Nandesari	.. Nandesari—2	37	12	25 to 35
	Bulsar				
4	Bulsar ..	.. Bulsar—7	42	15	15 to 20
5	Vapi	.. Vapi—8	187	25	120 to 130
	Surat				
6	Udhna ..	.. Surat—2	25	..	30 to 35
7	Katargam	.. Surat—2	82	—	85 to 90
	Kaira				
8	Nadiad ..	.. Nadiad—2	33	16	25 to 30
9	Cambay ..	.. Cambay—3	25	15	20 to 25
	Bhavnagar				
10	Chitra ..	.. Bhavnagar—5	30	18	20 to 30
	Rajkot				
11	Aji ..	.. Rajkot—8	100	..	100
	Jamnagar				
12	Jamnagar .	Jamnagar—2	60	..	60
	Panchmahals				
13	Godhra ..	Godhra—3	20	7	10
	Mehsana				
14	Kalol ..	. Kalol—2	20	..	20
	Kutch				
15	Gandhidham	Gandhidham—2	52	42	10

APPENDIX B

LIST OF AIRPORTS MAINTAINED BY THE CIVIL AVIATION DEPARTMENT OF THE GOVERNMENT OF INDIA

(See Para 3.2.4)

Name of airport	Dimensions of Runway		LCN	Pavement	Elevation above mean sea level	
	(in metres)	(in feet)			(in metres)	(in feet)
Ahmedabad	2286 × 46	7500 × 150	60	Rigid	55	180
	1463 × 46	4850 × 150				
Baroda	1646 × 46	5400 × 150	30	Rigid	37	121
Bhavnagar	1646 × 46	5400 × 150	30	Flexible	55	180
Bhuj	976 × 46	3250 × 150	30	Flexible	79	257
Kandla	1524 × 31	5000 × 100	30	Rigid	29	95
Keshod	1128 × 46	3750 × 150	10	Flexible	50	165
Porbandar	1097 × 37	3638 × 120	20	Flexible	5	17
	1006 × 37	3290 × 120				
Rajkot	1646 × 46	5400 × 150	22	Flexible	134	438

APPENDIX C

STATISTICS OF TRAFFIC CARRIED ON VARIOUS AIR ROUTES PASSING THROUGH GUJARAT

(Para 3.3.1.2)

Sr. No.	Name of routes	1967-68		1968-69	
		Mail unit in Kgs.	Freight Unit in Kgs.	Mail Unit in Kgs.	Freight Unit in Kgs.
1	2	3	4	5	6
1	Bombay-Ahmedabad-Udaipur-Jaipur-Delhi	2,19,612	2,86,084	2,20,848	31,224
2	Bombay-Keshod-Porbandar	16,635	1,00,242	11,948	39,263
3	Bombay-Rajkot	48,211	1,78,202	49,561	1,52,632
	Bombay-Rajkot-Ahmedabad Kandla-Bhuj (From 16th November 1967) ..				
4	Bombay-Bhavnagar ..	39,602	1,49,816	40,084	1,05,175
5	Bombay-Jamnagar-Kandla .	80,135	1,84,279	62,575	2,02,016
	Bombay-Jamnagar-Kandla Bhuj (from 6th June 1967) ..				
	Bombay-Jamnagar-Bhuj (from 1st January 1968)				
6	Bombay-Ahmedabad (from 3rd February 1969.)	..	..	7,298	12,664

Number of passengers originating from airports in Gujarat

Sr. No.	Name of Airport	1969-70	1970-71
1.	Ahmedabad	39,347	[illegible]
2.	Bhavnagar	13,374	[illegible]
3.	Bhuj	6,565	[illegible]
4.	Jamnagar	10,7?0	[illegible]
5.	Kandla	4232?	[illegible]
6.	Keshod	[illegible]	[illegible]
7.	Porbandar	[illegible]	[illegible]
8.	Rajkot	[illegible]	[illegible]
9.	Baroda	[illegible]	[illegible]

Source : Indian Airlines, Bombay Region.

APPENDIX D

STOL SERVICES
(Para 3.7.3)

	Route	Tourist etc., place served	Approximate Distance (in kms.)
1.	Ahmedabad-Abu Road	Mount Abu Hill Station	177
2.	Ahmedabad-Mehsana	Modhera Sun Temple	74
3.	Ahmedabad-Bhavnagar	Palitana Temples	188
4.	Rajkot-Sasan	Gir Lion Sanctuary	122
5.	Keshod or Veraval-Sasan	Gir Lion Sanctuary	35
6.	Rajkot-Bhuj	Commercial Potential	145
7.	Baroda-Surat	Commercial potential	119
8.	Surat-Daman	Beach Tourism	77

APPENDIX E

IMPORTANCE OF AIR PORTS AND CIVIL AIR TRANSPORT

(Para. 3.6.1 and 3.7.3)

1. There is a common misconception that flying is only for the privileged. It is generally not realised that airports are for everybody, i.e., even for those who do not fly. They bring business to the community as a whole. They help local people to do business more easily with people in other localities. Even where there is no commercial airline service, an airport in any location provides a direct connection to the nation's air transportation system by means of air taxis or private planes. Thus, they provide a link with the jet age which is fast coming to India. Besides, at an airport, young men can learn to fly. Airports attract industry to a locality and transient tourists using airports bring foreign exchange to the country's economy.

2. To get some idea of the amount of flying done by small aircraft in an advanced country, we may consider the statistics for General Aviation, i.e. for all flying except by Commercial airlines and Military aircraft. During 1970, the 1,30,000 aircraft in the United States General Aviation fleet did a total of 26 million flying hours, distributed as follows, :—

Personal flights	6 million flying hours
Business flights in 'executive' aircraft belonging to companies.	8 million flying hours
General Aviation Commercial flights in small aircraft, including Air Taxis.	5 million flying hours.
Instructional flights	7 million flying hour

3. As indicated earlier, an airport serves as a transportation hub at which it provides access to the nation's transportation systems. Elsewhere in the world, communities are realising that to be without air services to-day is as detrimental to development as being by passed by a railway or left out from the highway map some years ago

4. Communities that are not readily accessible to airways suffer penalties that can affect local citizens, whether they use air services or never have occasion to fly.

5. There is another important aspect. With the addition to its fleet of bigger and faster planes, it is quite possible that Indian Airlines will not be able to provide services to some of the smaller airports. These will have to be served by air taxis or any other air service, which will have to be put up by the States or by subsidiaries of Indian Airlines in collaboration with the State Governments.

6. The Summary below is from the Report prepared in 1971 by Dr. Nandini U Joshi of the Indian Institute of Management for Indian Airlines on 'Importance of Civil Air Transport to the Indian Economy'. It is referred to in Para 3 6.1 also and is reproduced here with acknowledgements to Dr. Joshi and to Indian Airlines, which commissioned this study. —

Summary

Civil air transport is an essential and productive sector of the Indian economy. The economic benefits brought by civil air transport and related industries in terms of employment, incomes and expenditures, foreign exchange earnings and international trade, having been examined are found to be positive and substantial for the Indian economy.

Overall contribution of civil air transport to the Indian economy, t[illegible] together and considering the multiplier effect was in excess of Rs. 1,312 shown in table I below This amount would have been even higher, h[illegible] to figure out the multiplier effect of incomes, expenditures and investmen[illegible] secondary and service companies indirectly involved in the civil air tra[illegible]

APPENDIX E—*concld.*

TABLE I

Contribution of Civil Air Transport and Related Industries to the Indian Economy, 1968

	(Rs. in millions)
Income and Staff Payments (1)	1,500
Expenditure (2)	367
Purchase of assets (2)	185
Expenditures of foreign visitor arriving by air. (1)	677
Total	2,729

(1) Multiplier effect included

(2) Multiplier effect unknown

Civil air transport is important to Indian economy, in terms of India's foreign trade and foreign exchange earning also. These findings are summarised in Table 2 below :—

TABLE 2

Contribution of Civil Air Transport to India's Foreign Trade, 1968

	(Rs. in millions)
Foreign Exchange Earnings	
(1) Airlines	671
(2) Air visitors	222
Total	893
Exports by air	501

Contribution of civil air transport to the Indian economy is vital and irreplaceable. Apart from the indispensability of a system of airlines, the economic advantages reaped from the civil aviation indicate the desirability for a rapid growth of civil air transport in India.

APPENDIX F

REQUIREMENT OF AIR SERVICES IN GUJARAT DURING THE 1980's

(Para 3.8)

1. A study of the long distance road transport services (Luxury buses and others) operat[ed] by the Gujarat State Road Transport Corporation (GSRTC) has been made. In th[e] Statement below, the routes, their length in kilometres and the number of trips operate[d] on each route during the years 1968 to 1971 are given. Based on the experience o[f] GSRTC with the growth rate on these routes, a projection has been made about the probable requirement of the number of trips by the year 1980. This is given in Column 8 of the Statement.

The study indicates that in order to cope with the increasing traffic, GSRTC will be required to operate a large number of trips on these long distance services. Sufficient direct traffic will be generated during the next 5-10 years between the termini of the given routes and this direct traffic may well be quite sufficient to justify air services before 1984.

2. It is, therefore, felt that air services on the following routes may be considered in the Perspective Plan 1974-1984 :—

(i) Ahmedabad-Bhuj

(ii) Ahmedabad-Porbandar

(iii) Ahmedabad-Junagadh

(iv) Ahmedabad-Surat

(v) Ahmedabad-Jamnagar

(vi) Ahmedabad-Godhra

(vii) Ahmedabad-Indore

These air services are shown in the map of Gujarat.

3. As regards the increased use of luxury cars, tourist taxies introduced in Gujarat from 1963-64, indications available with the State Director of Transport show that the trips of such vehicles from Ahmedabad are in the majority of cases to Udaipur and Mount Abu as also to the following tourist centres :—

Sasan Gir (Prabhas Patan-Somnath)

Ambaji (Abu)

Modhera (near Mehsana)

Somnath (near Veraval)

STATEMENT WITH APPENDIX F

Gujarat State Road Transport Corporation

Sr. No.	Name of the route	Route length in km.	Number of trips operated with Luxury and Ordinary Coaches				Trips likely to be operated in 1980
			1968	1969	1970	1971	
1	2	3	4	5	6	7	8
1	Ahmedabad-Surat ..	216	..	..	1 Luxury	1 Luxury 2 Ordinary (Ahmedabad-Ukai)	12
	(a) Ahmedabad-Bulsar *via* Surat	378	..	..	1	1 Ordinary 1 Luxury	12
2	Ahmedabad-Bhuj ..	442	1	2	4	5	15
3	Ahmedabad-Junagadh ..	321	1	2	3	3+1 Luxury	13
	(a) Ahmedabad-Somnath *via* Junagadh	413	..	1	2	2+1 Luxury	13
4	Ahmedabad-Jamnagar ..	313	1+1 Luxury	2+1 Luxury	4+1 Luxury	4+1 Luxury	14
	(a) Ahmedabad-Dwarka *via* Jamnagar	473	..	..	1 Ordinary	1 Ordinary	10
5	Ahmedabad-Godhra ..	145	1	2	3	4+1 Luxury	15
	Ahmedabad-Dohad *via* Godhra.	217	1	2	2	3	10
6	Ahmedabad-Porbandar ..	403	1	1	1+1 Luxury	1+1 Luxury	10
7	Ahmedabad-Indore ..	420	1+1 by Madhya Pradesh	1+1 by Madhya Pradesh	1+1 by Madhya Pradesh	1+1 by Madhya Pradesh 1 Luxury	10

Report of the Working Group on Transport and Communications

SUMMARY

SUMMARY OF THE REPORTS OF THE SUB-GROUPS ON ROAD DEVELOPMENT ROAD TRANSPORT, PORTS, HARBOURS AND INLAND WATER TRANSPORT., TOURISM AND THE DEVELOPMENT OF PLACES OF ARCHAEOLOGICAL IMPORTANCE, AND TELECOMMUNICATIONS, RAILWAYS AND CIVIL AVIATION

"If a man takes no thought about what is
distant, he will find sorrow near at hand".

—Confucius

Economic advance depends on the co-ordinated development of various sectors. It is imperative that this development is on a planned basis. Increasing emphasis has now to be placed on the development of the infrastructure. Otherwise, large capital outlays remain unproductive and gestation periods are long. Regional perspective planning, covering a reasonably long period, say, ten years is important because it enables attention to be focussed on regional development as a whole and is a logical outcome of developments in different sectors. Implementation will, of course, depend on the availability of resources, fiscal, human and natural but the process of giving full thought to the needs of society enables planners to fix priorities in a more rational manner and thereby to achieve the optimum use of available resources.

2. This Working Group has been entrusted with the task of preparing a Perspective Plan for Transport and Communications for the period covering the ten years 1974 to 1984, *i. e.*, the Fifth and Sixth Plans. The Group decided that its report should cover the following subjects :—

(i) Road Development
(ii) Road Transport
(iii) Ports, Harbours and Inland Water Transport.
(iv) Tourism and the Development of Places of Archaeological Importance.
(v) Telecommunications, Railways and Civil Aviation.

3. Transport and communications are of obvious importance for the economic development of any region. Their role during times of stress such as war needs no emphasis. The development of other sectors such as industries, mining, agriculture depends, to a great extent, on the development of the transport and communications network. This is clearly a key subject and is important in making the country self-reliant. At the same time, it has to be borne in mind that the provision of transport and communications facilities is something which cannot be clearly and precisely evaluated in terms of the return on capital invested.

4. For the sake of convenience as also to give an idea of what is proposed to be achieved in the various sectors covered by the Group, the recommendations are summarised in the following paragraphs. It is suggested that these may be read with Statement I and II which give details of the Fourth, Fifth and Sixth Plan outlays in money terms and of the physical programmes/estimated levels of achievement.

Road Development

5. For balanced development of the road system in the country, targets were laid down under the 'Nagpur Plan' and subsequently under the Twenty Year Plan. Gujarat has been lagging behind in achieving the targets under these Plans. The Working Group, therefore, proposes that in the Perspective Plan period the road network as envisaged in the Twenty Year Plan must be completed. Even this will not be enough as it will cover only 80 per cent of the villages in Gujarat. Accordingly, the Group proposes that the remaining 20 per cent of the villages should

SUMMARY OF THE REPORTS OF THE SUB-GROUPS ON ROAD DEVELOPMENT ROAD TRANSPORT, PORTS, HARBOURS AND INLAND WATER TRANSPORT,, TOURISM AND THE DEVELOPMENT OF PLACES OF ARCHAEOLOGICAL IMPORTANCE, AND TELECOMMUNICATIONS, RAILWAYS AND CIVIL AVIATION

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also be connected before 1984 and all rural roads asphalted before then, even though it will entail the expenditure of large sums. Improving the surface of existing roads, widening the State Highways, providing an Expressway between Ahmedabad-Bombay and the development of roads to meet the needs of special interests such as tourism, archaeological monuments, industries, mining, ports, etc., have all been considered.

Among the suggestions considered for collecting additional revenues to finance some of these important projects, the setting up of Toll Highways has been recommended. Toll Highways are common in U. S. A., Japan and on the Continent of Europe. The receipts are applied to the payment of interest and retirement of capital invested in the construction of highways, as also their cost of operation and maintenance. Hitherto, India has fought shy of introducing Toll Highways because the experience is that the collection of revenues in this manner leads to vexatious delays on the roads and is also a source of corruption. The Group feels that if super highways of the type provided in other countries are to be built, as they must be, to serve the economic needs of Gujarat, a beginning must now be made with Toll Highways. The fear of delays and corruption can be laid at rest by introducing machines for the collection of tolls. Locally produced machines can be developed for this specific purpose.

The Fourth Plan outlay on Road Development is only Rs. 40 crores. To achieve even the modest targets set before it, the Group finds that the outlay in the Fifth Plan period will have to be Rs. 130 crores and, in the Sixth Plan period, Rs. 260 crores. These investments may appear to be very large but it must be remembered that in comparison with other States, Gujarat has a good deal of leeway to make up. Hariyana, to mention only one State, is able to claim that it will have tarred roads connecting each and every village in the State by 1973. In Gujarat, this will be possible only during the Perspective Plan period 1974-1984 and then, only if outlays of the order indicated by the Group are made. It has to be remembered that the existing roads have to be constantly upgraded to cope with the increased traffic on account of the greater tempo in the industrial and agricultural spheres as well as the movement of traffic during hostilities. This increase is quantitative as well as qualitative, requiring increases in the size of the roads as well as their load bearing capacity, etc.

Road Development

(*i*) Complete the road development network in Gujarat as proposed in the Twenty Year Road Plan. The target : 57,628 kms. of roads by 1984.

(*ii*) Provide a four-lane Expressway between Ahmedabad and Bombay or at least between Ahmedabad and Baroda.

(*iii*) Provide missing links and diversions on all State Highways by-passing congested towns.

(*iv*) Provide approach roads to all villages in Gujarat.

(*v*) Provide roads to meet the special needs of tourism, archaeological sites, mining, industries, ports, etc.

(*vi*) Provide roadside amenities such as travellers' bungalows, motels, parking facilities, lay-byes, canteens, etc.

(*vii*) Replace important level crossings by under or over bridges.

(*viii*) Widen State Highways into two lanes.

(*ix*) Develop arboriculture and roadside parks.

(*x*) Provide adequate road safety measures.

Road Transport

6. With the setting up of the Gujarat State Road Transport Corporation (GSRTC), passenger transport has been fully nationalised. The Corporation provides direct bus services to 61·3 per cent of the towns and villages in the State covering 85.5 per cent of the total population. Apart from this, 21.6 per cent of the villages, covering 8.5 per cent of the population are provided with bus facilities within a distance of 3 kms. The Group considers that to give a spur to economic activity, GSRTC must provide services to all villages. It is proposed to achieve this during the Perspective Plan period. With the too rapid growth of

passenger services, the comfort of the passenger has tended to be neglected. The
proposes the improvement of passenger facilities. Load factors are to be kept within rea
limits. Luxury services are to be provided and greater emphasis placed on safety me
etc. Extending the services in this manner will depend to a certain extent on the availabil
vehicles as well as on the adequacy of the road system but the Group's proposals sh
enable GSRTC to provide safe, efficient, economic and comfortable services to the trave
public to an increasing degree. Tourist traffic has also been given due emphasis

The State outlay on Road Transport in terms of the amounts provided to GSRTC duri
the Fourth Plan period will be Rs. 7.67 crores (the amount from the Centre being Rs 3.8
crores). To achieve the modest goals set out in the Perspective Plan, GSRTC will need Rs 21 83
crores in the Fifth Plan period and Rs. 34 58 crores in the Sixth Plan period from the State, the
amounts from the Centre being Rs 10.91 crores and Rs. 17.29 crores, respectively.

Road Transport

(i) Providing direct service to a larger number of villages At present, the Corpo-
ration provides direct services to 11,499 towns and villages, i e. 61 28 per cent of the total
number of towns and villages in the State. It is proposed to provide direct service to the
remaining 7,266 villages in stages

(ii) Increase the number of schedules at the growing rate of 10 per cent per year For this,
it will be necessary to purchase 2,912 vehicles during the Fifth Plan and 4,688 vehicles
during the Sixth Plan.

(iii) Provide a larger number of bus stations. At the end of the Fourth Plan, the number
of permanent bus stations is expected to be 50. Additional 60 bus stations should be cons-
tructed in the Fifth and Sixth Plan periods, covering all district headquarters, places
of tourist interest and important traffic centres

(iv) Increase the temporary bus stations from 108 at the end of the Fourth Plan to 168
by 1983-84.

(v) Provide more luxury coaches on important routes

(vi) Provide more facilities to the passengers and especially to tourists

(vii) Provide more repairs and maintenance facilities such as workshops, plants and
equipment.

(viii) Provide more amenities for employees such as quarters for staff.

(ix) Greater attention to training, research and management development.

(x) Provide adequate safety measures

(xi) Provide better telephone and other communications between important
traffic centres.

(xii) Free movement of goods vehicles at the State checkposts.

and Harbours

Gujarat is one of the important maritime States of India having long and rich marine
s. It has 1 major port, 11 intermediate ports and 28 minor ports along the 1,600
s of its coastline. The traffic pattern has been changing fast and the size of ships is
g rapidly. The result is that lighterage ports, capable of giving small dep
coming out of date. The Plan, therefore, emphasises the need for d

berthing ports, where modern and mechanised handling facilities will enable the rapid turn-round of ships. Containerisation, palletization and other modern advances are taken into account in the planning of ports. The development of deep draft ports is of particular importance as the size of oil tankers is constantly on the increase. Gujarat has ports which have the potential of receiving the super-tankers that are now being used for the movement of oil. A deep-draft port will be needed especially if the Bombay High and other off-shore structures yield oil / gas. Such a port is also needed for the crude oil needs of the proposed North-West Refinery near New Delhi. The Fourth Plan outly on ports, etc., is to be Rs. 5.00 crores in the State sector and Rs. 6.92 crores in the Central sector. The Group proposes that in the Fifth Plan period, the outaly should be Rs. 10.00 crores and Rs. 18 crores in the Sixth Plan period, with Rs. 6.5 crores and Rs. 7.00 crores from the Centre in the Fifth and Sixth Plan periods.

Inland Water Transport

The scope of development of this mode of transport in Gujarat is relatively limited because of the absence of large perenial rivers except the Narmada and the Tapti. In these two rivers and in a few others, navigation is seriously hampered at some places due to silting, etc. The navigability of river-ways must, therefore, be improved. The geographical configuration of Gujarat makes sea connection between the Saurashtra and Gujarat coasts necessary and, therefore, the development of modern and fast ferry services between Bhavnagar-Dahej, has been considered. The Fourth Plan outlay for Inland Water Transport is to be Rs. 1.30 crores and is to be obtained from the Centre as per recommendations of the Bhagwati Committee. The Group proposes that in the Fifth Plan period, the outlay should be Rs. 1.C0 crore and Rs. 0.75 crore in the Sixth Plan period and all the schemes during Fifth and Sixth Plan periods should be included in the Central sector.

Ports, Harbours and Inland Water Transport

Ports and Harbours

(*i*) Develop new deep-water sheltered ports.
(*ii*) Increase efficiency of the present port working and attend to harbour expansion, electrification cf cranes, better transport facility, etc.
(*iii*) Mechnical handling of bulk cargo such as salt / bauxite.
(*vi*) Navigational aids for night navigation.
(*v*) Provide lighters and tugs / launches for quick transport of goods between ship and shore.
(*vi*) Dredgers and dredging for maintaining water depth.
(*vii*) Marine surveys and investigations, model testing, research, etc.
(*viii*) Modernisation and expansion of port workshops, purchase of modern equipment and appliances, including dry-dock and slipway facilities.
(*ix*) Approach roads, railway sidings, water supply, and electrification, etc.
(*x*) Training of personnel.
(*xi*) Labour welfare and housing.

Inland Waters

(*i*) Provide landing facilities on the Narmada-Tapti-Purna rivers.
(*ii*) Purchase dredging equipment for improving the navigability of selected rivers.
(*iii*) Develop ferry services between Dahej-Ghogha.

Tourism and the Development of Places of Archaeological Importance

8. In Gujarat, there are a number of places of tourist importance. Sasan-Gir, Palitana, Somnath, Dwarka, Porbandar, Modhera are a few of these. They attract sizable tourist traffic even now. Without spreading the expenditure of scare resources too thinly, these and other places of tourist attraction should be further developed by providing hotels, motels, transport facilities, etc. To satisfy the recreational needs of the growing population, more holiday homes

need to be provided and the existing ones modernised and improved. The Group proposes the formation of a Tourist Corporation so that this important activity can be expanded in the most efficient manner. A bold and imaginative approach to this sector will have a significant impact on earning foreign exchange, besides providing local employment and furthering integration. The Fourth Plan period outlay on Tourism is to be Rs 0.50 crores. This is a very much neglected sphere of activity and very little has been done in all the four Plan periods in Gujarat. The Group, therefore, proposes that the outlay in the Fifth and Sixth Plan periods should, in all, be Rs. 5 crores, Rs. 2.5 crores to be spent in each Plan period.

For the development of places of archaeological importance, it is necessary to provide approach roads, directional and other signs and fencing of the required strength as well as other security arrangements so that the surroundings of the monuments and the trees, shrubs, gardens, etc., around them are secure. Trained English speaking guides at some of the important monuments visited by foreign tourists will also be required. A fresh survey of all such places in Gujarat is necessary so that this work can be completed during the Fifth Plan, before the monuments deteriorate further due to the elements and the attentions of souvenir hunters. The required provisions for these matters have been made in the Plan. They are included in the total of Rs. 5.0 crores, the outlay on approach roads being included in the Road Development Plan.

Tourism and the Development of Places of Archaeological Importance

(i) Establish Gujarat Tourist Corporation.

(ii) Develop Sasan Complex.

(iii) Develop Ahmedabad Complex.

(iv) Ropeway and tourist bungalow at Palitana.

(v) Tourist bungalow, canteen, etc at Dwarka.

(vi) Dormitories, etc. at Modhera.

(vii) Develop Shamalaji.

(viii) Develop picnic spots, dharmashalas, new holiday homes, etc.

(ix) Ropeway at Girnar, Pavagadh, etc.

(x) Facilities for coastal conducted tours.

... Develop hotels and motels.

... Develop Malsamot in Broach district or any other suitable location as a hill ...tation

...urist offices at Jaipur, Calcutta, etc.

...ent attention to development of places of archaeological importance and the ...torate of Archaeology.

...diate steps for the protection and preservation of wild life.

...ns, Railways and Civil Aviation

... on telecommunications, on railways, on the airports in Gujarat and on the ... by Indian Airlines are entirely by the Central Government and the con-

cerned organisations such as the Railway Board, Indian Airlines, etc. As regards civil aviation in the State, Gujarat has hitherto spent next to nothing during the last four Plan periods. The Group proposes that in view of the need for building a modest infrastructure of airstrips to serve the needs of the coming decade and to give encouragement to air services for tourists as well to provide a network of connections from the capital to the district headquarters and other places of importance, an expenditure up to Rs. 5 crores in the two Plan periods may be made. The spread of the outlay, year by year, will have to be on the basis of the experience gained, as this is an entirely new sphere of activity.

There is great need for increasing and improving these facilities. Major changes are afoot in the sphere of civil aviation and larger and faster aircraft are significantly affecting the economy of air transportation. Increasing economic activities demand more air travel facilities and Gujarat should step in, to a limited extent in the beginning, by providing the necessary encouragement and facilities to civil aviation. There is great scope for expansion in cargo traffic by air, especially as Gujarat is rich in the production of fruit, fish and other delicacies. A closer liaison at State level with the Government of India in the Directorate of Civil Aviation is also called for. For this, it is suggested that an Aviation Adviser to the State Government should be appointed as in some other States. The development of flying clubs and gliding clubs activities in Gujarat must also be encouraged.

10. Statement I makes it clear that against the total Fourth Plan State outlay of Rs. 42.83 crores on Roads, Transport, Ports and Tourism, the requirements for these sectors in the Fifth Plan are as high as Rs. 136.83 crores and Rs. 257.58 crores in the Sixth Plan. It was indicated to all the Working Groups before they took up the preparation of their Plans that they should try to keep their recommondations such that the outlay in the Fifth Plan was about double that in the Fourth Plan and in the Sixth Plan double that in the Fifth Plan. While this has been possible for the Ports, Harbours and Inland Water Transport Sub-group, the Road Development Sub-group, particularly, has found it quite impossible to keep within these ceilings. As indicated, Gujarat has lagged behind in roads not only by the target set in the Nagpur Plan, but also in the succeding Plans. Additional road mileage and the improvement of the existing road surfaces, width, etc. is now quite unavoidable. The Group is of the view that not only because of their role as important elements of the infrastructure of development, but also because of the increased employment they provide for every crore rupees of investment, a higher priority will have to be given to Road Development in Gujarat during the Fifth and Sixth Plans. As regards Tourism and attention to Places of Archaeological Importance, the progress during the earlier Plans has been so slow that the figure of Rs. 50 lakhs outlay during the Fourth Plan cannot serve as the base for the outlays in the Fifth and Sixth Plans. It is because of this and the need of this important sector and its potential for foreign exchange earning as well as the need for protecting archaeological monuments immediately that the Group recommends the outlay of Rs. 5 crores in the two Plans together. Lastly, in the State Civil Aviation sphere, the expenditure in the earlier Plans was practically nil (one or two airstrips and a few helicopter pads apart from subventions to the flying clubs). The Group recommends that apart from reserving land at either end of all the present airports used by Indian Airlines to allow of their developments as jet airports in the 1980's, the State Government should now devote attention to civil aviation within the State not only because it is important for the foreign tourist traffic but also because it will help in the political, administrative and psychological integration of the different regions in the State. The expenditure of approximately rupees five crores over the two Plan period is for phased investment in airstrips at district headquarters and places of tourists and other importance as also for subventions to flying clubs and for investment in agro-aviation or in versatile aircraft to be used for plant protection and/or tourist charters, movement of passengers, etc., and for use during emergencies such as floods, earthquakes, locust control, etc.

Adequate steps must also be taken by the Government of India bodies concerned to provide a sufficiency of telephones, telecommunications and telex facilities in Gujarat to cope with the rising demand for all these. The Railways marshalling yards will also have to be improved to meet the requirements of agriculture and industry in Gujarat.

STATEMENT I

Sectoral and Sub-sectoral Outlays

(Rs. in lakhs)

Sr. No.	Sector and Sub-sector of development	1969-74 Fourth Plan outlay	1974-79 Fifth Plan outlay	1979-84 Sixth Plan outlay
1	2	3	4	5
1.	*Road Development*			
(i)	Development of roads in Gujarat	†	†	†
(ii)	Development of national highways in Gujarat ..	4,000.00	13,000.00	26,000.00
	†Of the above .	1,370.00	4,200.00	8,300.00
	Outlay by State Government	2,966.00	10,000.00	20,000.00
	Outlay by Central Government .	1,034.00	3,000.00	6,000.00
2.	*Road Trasport*			
(i)	Expenditure on vehicles for expansion	948.04	2,748.32	4,743.77
(ii)	Land ..	72.25	220.00	420.00
(iii)	Buildings	290.48	920.13	1,704.05
(iv)	Plant, machinery and equipment	86.32	100.00	125.00
	Total ..	1,397.09*	3,968.45*	6,992.82*
	*Of the above			
	Outlay by State Government ..	766.66	2,162.96	3,457.79
	Outlay by Central Government ..	382.48	1,091.48	1,728.59
3.	*Ports, Harbours and Inland Waters*			
	STATE SECTOR SCHEMES			
	(1) *Development of intermediate and minor ports*			
(i)	Navlakhi	23.50	25.00	50.00
(ii)	Bedi	18.00	100.00	200.00
(iii)	Sikka/Salaya	28.00	.	50.00
(iv)	Okha	37.00	80.00	150.00
(v)	Porbandar	18.50	50.00	50.00
(vi)	Veraval	16.30	50.00	100.00
(vii)	Pipavav	16.00	10.00	..
(viii)	Mahuva	9.40	10.00	25.00
(ix)	Bhavnagar	44.30	70.00	150.00
(x)	Narmada Port	15.00	30.00	240.00
(xi)	Other minor ports	..	50.00	30.00
(xii)	Replacement of equipment	..	125.00	140.00
(xiii)	Construction of office building and staff quarters at various ports.	14.00	25.00	50.00
(xiv)	Dredgers and dredging ..	150.00	325.00	200.00
(xv)	Survey of Gujarat Coast ..	5.00	25.00	25.00
(xvi)	General Schemes for various ports ..	86.00		..
(xvii)	Spill over schemes of previous Plan ..	20.00	25.00	20.00
	Total, State Sector ..	500.00	1,000.00	1,400.00

STATEMENT 1—*concld.*

Sr. No.	Sector and Sub-sector of development	1969-74 Fourth Plan outlay	1974-79 Fifth Plan outlay	1979-84 Sixth Plan outlay
1	2	3	4	5
	CENTRAL SECTOR SCHEMES			
(i)	Porbandar all-weather port	692.00	200.00	..
(ii)	Porbandar all-weather port, new schemes	..	50.00	..
(iii)	Salaya	..	400.00	100.00
(iv)	Pipavav	..	..	600.00
	Total, Central Sector ..	692.00	650.00	700.00
	State Sector Schemes ..	500.00	1,000.00	1,800.00
	Central Sector Schemes ..	692.00	650.00	700.00
	Grand Total ..	1,192.00	1,650.00	2,500.00
	Inland Water Transport			
	CENTRAL SECTOR			
(i)	Landing facilities	9.50	6.00	..
(ii)	Purchase of dredging equipment	80.00	60.00*	5.00*
(iii)	Hydrographic Survey	2.50	2.00*	..
(iv)	Development of ferry service between Dahej and Gogha.	38.00	12.00*	2.00*
(v)	Purchase of Flotilla craft	..	15.00	63.00
(vi)	Inland water transport cell	..	5.00	5.00
		130.00	100.00	75.00
4	*Tourism and the development of places of Archaeological Importance :*			
(1)	Development of Sasan Complex construction of additional accommodation, swimming pool, tree-top hotel, resettlement of Maldharis, etc.	..	50.00	43.50
(2)	Development of Ahmedabad Complex-Beautification of tourist spots at Ahmedabad, development of Nal-Sarovar.	..	18.00	12.00
(3)	Development of Palitana, (Ropeway and tourist bunglow, Modhera, Dwarka, Shamalaji (accommodation), Girnar-Pavagadh (Ropeways, etc.).	..	40.00	54.50
(4)	Development of hot springs, picnic spots, holiday homes, Dharmashalas etc.	..	32.00	32.00
(5)	Transport facilities, hotel and motel projects, opening of tourist offices at Calcutta, Jaipur, etc., training personnel, strengthening of the tourist section, etc.	..	15.00	18.00
(6)	Coastal conducted tours	..	10.00	5.00
(7)	Development of hill station	..	5.00	15.00
(8)	Publicity abroad	..	5.00	5.00
(9)	Establishment of Gujarat Tourist Corporation†	..	55.00	55.00
(10)	Development of places of archaeological importance.	..	20.00	10,00
	Total ..	..	250.00	250.00

* Spill over amount of previous Plan.

† Once the proposed Tourist Corporation comes up, much of the above outlays would be through the Corporation to which the Government will have to contribute through Equiy and Loan Capital. The Corporation will no doubt judge the priorities and decide on the expenditure judging it from the promotional point of view and the return on capital.

5. Telecommunications, Railways and Civil Aviation

These subjects are under the jurisdiction of the Government of India. The proposals ma[de] by the Working Group are recommendatory in character. While no financial outlays hav[e] been indicatend for bodies such as the P. and T. Board, Indian Railways, Indian Airlines an[d] the Civil Aviation and Meteorological Departments of the Government of India, the Group has proposed that the Government of Gujarat should spend Rs. 5 crores in the Fifth and Sixth Plans for providing airstrips at district headquarters and places of tourist interest as also for purchase of small aircraft, partly for agro-aviation and partly for administrative and tourist services.

Summary

(Rs. in crores)

	1969-74 Fourth Plan outlay	1974-79 Fifth Plan outlay	1979-84 Sixth Plan outlay
State Outlay			
Roads	29.66	100.00	200.00
Transport	7.67	21.83	34.58
Ports, etc.	5.00	10.00	18.00
Tourism, etc.	0.50	2.50	2.50
State Civil Aviation	0.00	2.50	2.50
State Outlay	42.83	136.83	257.58
Central Outlay			
Roads	10.34	30.00	60.00
Transport	3.82	10.92	17.28
Ports, etc.	6.92	6.50	7.00
Tourism, etc.	..	..	.
Civil aviation	..	..	..
Central Outlay	21.08	*47.42	*84.28
Development of National Highways works in Gujarat (Entirely financed by the Government of India).	13.70	*42.00	*83.00
Grand Total for Transport and Communications Group	77.61	226.25	424.86

* anticipated